
Appendix D
Biomass Wood Resource Assessment on a
County-by-County Basis for the State of
Georgia

**Biomass Wood Resource Assessment on a
County-by-County Basis for the State of Georgia**

**Prepared for the
Georgia Forestry Commission
Macon, Georgia**

**and the
Southern States Energy Board
Norcross, Georgia**

**Prepared by
General*Bioenergy, Inc.
P.O. Box 26
3115 Northington Court
Florence, AL 35630
256-740-5634**

**November 9, 2005
(Revised)**

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
INTRODUCTION, GOALS, OBJECTIVES	2
RESOURCE ASSESSMENT FINDINGS	2
Forestry Resources: Unmerchantable Standing Timber.....	2
Forestry Resources: Harvesting Residues	3
Primary Processing Residues: Mill Residues	3
Urban Wood Waste	3
Pecan Shells	4
Paper Mill Sludge	4
Black Liquor	5
CRP Potential.....	5
SUMMARY.....	6
REFERENCES.....	7
APPENDIX I.....	A-1
APPENDIX II.....	A-32
APPENDIX III.....	A-37

EXECUTIVE SUMMARY

General*Bioenergy, Inc. was selected by the Georgia Forestry Commission to perform a biomass wood resource assessment on a county level basis for the State of Georgia. Assessment findings are on an annual basis and provided in dry tons. The study found that there were 18,871,292 dry tons dry tons of forestry-related biomass materials available annually in Georgia for energy or other purposes.

Unmerchantable standing timber was by far the greatest wood resource available at 13,260,175 dry tons, assuming a 20 year grow cycle. Additionally, unutilized merchantable timber could potentially be available, but was not included in this study. Other wood resources assessed by the study are as follows: harvesting residues 5,314,287 dt/yr, mill residues 6,993,000 dt/yr, urban wood waste 86,209 dt/yr, pecan shells 22,297 dt/yr, paper mill sludge 395,210 dt/yr, and black liquor solids 12,066,840 dt/yr. These wood resources are based on the latest sampling year for which data was available.

INTRODUCTION, GOALS, OBJECTIVES

General*Bioenergy Inc. was selected by the Georgia Forestry Commission to perform a wood resource assessment on a county level basis for the State of Georgia. This assessment was to include wood resources such as unmerchantable standing timber, harvesting residues, mill residues, urban wood waste, paper mill sludge, pecan shells, and black liquor production on a county level basis for the State of Georgia. The study was to determine both quantitatively and qualitatively and using prevailing industry standards, the wood biomass that is currently and potentially available in the pre-defined area.

Project goals included the following:

1. Assess the amount of wood resources (unmerchantable standing timber, harvesting residues, mill residues [sawdust, bark, hog fuel], paper mill sludge, urban wood waste, pecan shells, and black liquor) generated on a county level basis for the state of Georgia.
2. For unmerchantable standing timber and mill residues (sawdust, bark, hog fuel), when feasible, determine the amount available or unutilized.

In addition to providing urban wood waste available at \$12.50/ton, General*Bioenergy, Inc. also included information on urban wood waste available at various other price ranges.

RESOURCE ASSESSMENT FINDINGS

Table A-1 shows the calculation for unmerchantable standing timber available annually based on a thirty-year growth cycle and a twenty-year growth cycle. Data for Table A-1 is on a county level basis and in dry tons per year. Additionally, Appendix III shows an alternative method of calculating unmerchantable standing timber for comparison. Table A-2 shows harvesting residues produced on a county level basis. This table converts harvesting residues from (cuft) to dry tons and provides the percent hardwood and softwood for each county in Georgia. Table A-3 displays mill residues broken down into sub categories of fine, bark, and course residues on a county level basis in dry tons. Table A-4 shows urban wood residues and the quantity available at \$12.50/dry ton. The data was broken down on a county level basis through correlating population with amounts of urban wood residues produced. This table also contains urban wood residue available at various other price ranges. Table A-5 shows pecan tree bearing acres per county and tons of pecan shells produced on a county level basis. Table A-6 shows paper mill sludge production on an annual basis, mill products produced, and paper plant location. Table A-7 shows board, paper, and pulp production in tons per day and calculates the amounts of black liquor solids produced in dry tons. Table A-8 is a combined resource chart that shows county totals for all assessed wood resources.

Forestry Resources: Unmerchantable Standing Timber

There are two major sources of standing forestry biomass inventory for energy: merchantable and unmerchantable timber. The former may include trees that are useable for commercial purposes, but have no near term market and thus may be available for energy applications.

Unmerchantable material is unsuitable for conversion into industrial wood products due to size, form, or quality. Forests in the South contain a significant amount of small diameter and underutilized material not suitable for lumber or other wood products. These overstocked stands increase the risk of insect, disease, fire, and drought damage, and because of their sparseness and remote location are usually more expensive to recover. The removal of this material could open up space in the forest for growing a new generation of higher quality trees.

These sources could provide the State of Georgia with approximately 8.8 million dry tons of *unmerchantable* wood per year based on a 30 year growth cycle or 13.2 million based on a 20 year grow cycle (Table A-1).

Forestry Resources: Harvesting Residues

Forestry harvesting residues are the unmerchantable tree portions (tops and branches) left from harvesting operations, as well as the small diameter, diseased, crooked, or otherwise defective trees remaining after a harvest has occurred. Landowners prefer that these harvesting residues be removed from the land in order to facilitate new growth. However, such removal creates expense for the landowner. According to the Georgia Forestry Commission (GFC), roughly 21 green tons per acre of harvesting residues are left in the forest. Also according to the GFC, less than 5% of forestry harvesting residues are currently used in Georgia [1]. As shown in Table A-2, there were approximately 5 million dry tons of harvesting residues potentially available in Georgia in 2003.

Primary Processing Residues: Mill Residues

Primary processing (mill) residues occur when logs are processed into boards or other products that are eventually used to manufacture other higher valued products. Examples of primary mills include sawmills and veneer mills. Processing residues consist of sawdust, slabs, end cuts, bark, shavings, and other types of residues. The quantities of mill residues produced at primary wood mills in Georgia were provided by the US Forest Service. These residues are classified into three categories; bark, coarse wood, and fine wood. The coarse material consists of slabs and end cuts and the fine material consists of sawdust and shavings

Advantages of processing resources are that they are already aggregated at a central point and usually require little, if any, additional processing and, if kept off the ground, can be relatively clean, low ash materials.

Markets for mill residues include mulch (especially bark), fuel, feedstock for composite materials (e.g., particleboard and medium density fiberboard), animal bedding, composting bulking agent, and other uses. The dominant unused forest processing residue is green sawdust. Most states in the South report less than 5% of mill residues are unused [2, 3, 4].

According to the US Forest Service, of the approximately 7 million tons of mill residues produced in the State of Georgia, 79,703 tons (Table A-3) or less than 1 percent are unutilized. The majority of mill residues are currently used for fiber, fuel, and other miscellaneous byproducts. However, companies often understate their waste residues; therefore, the amount available is often a greater percentage than the amount reported.

All mill residue data was compiled from the USDA Forest Service, Timber Product Output (TPO) Reports, Forest Inventory and Analysis, Southern Research Station. Mill residue data is from the last sampling year of 2003.

Urban Wood Waste

This biomass consists of used lumber, trim, pallets, wooden packaging materials, trees, branches, and other wood debris that is commonly brought to a landfill for disposal. However, it may also include trees and stumps from land clearing, right-of-way clearing debris, tree trimmings by professional arborists, and tree-related storm debris. An average of 50 acres per day of forests are cleared in the Atlanta area for development [2].

Frequently, urban wood wastes can be obtained in mono-loads—which are loads that are comprised of all one material (e.g., a load of used pallets). Mixed loads may have treated wood or non-wood materials commingled with them, making them less desirable. The moisture content of urban wood waste varies from very high (~50%) for green tree trimmings to very low. Pallets and wooden packaging materials, if kept indoors, will have a moisture content of approximately 12%. Wood residues from furniture manufacturing or any process that requires gluing will have moisture contents of approximately 5-6%, unless exposed to rain or the atmosphere for a long period of time.

Depending on their quality, urban wood residues have several different potential alternatives for disposal. Markets or uses for urban wood wastes include use as feedstocks for engineered woods (particle board, laminated woods, and plywood), landscape mulch, soil conditioner, animal bedding, compost additive, sewage sludge bulk medium, and boiler fuel.

This material is characterized as low in value and usually has a tipping fee associated with it. It may also have treated wood or non-wood materials co-mingled with it (e.g., pallets that are nailed or glued together) and frequently have higher ash and alkaline metal contents relative to other forms of biomass.

For this study, since urban wood wastes normally have a tipping fee associated with them; it was assumed that 100 percent of the urban wood waste would be available. At \$12.50 per dry ton value, approximately 86,209 dry tons of urban wood residues would be available annually (Table A-4).

Pecan Shells

Pecan shells are the casings that enclose the nut meat (kernel). At maturity, the outer hulls of the nut split open while still on the tree and allow the nut to fall to the ground, where it is harvested. The nuts are collected and taken to a central location for shelling. Due to shipping costs, 85% of all pecans are shelled and sold as nutmeats [5]. Georgia produces around 160 million lbs of pecans per year. Of the 160 million pounds, 58.5% are kernel or nutmeat. That leaves 41.5% of the pecan as shell [6]

Since complete nutmeat halves are more valuable than nutmeat pieces, shelling practices aim to optimize the production of whole nutmeat halves. To facilitate cracking of the shell and thus minimize nutmeat breakup, approximately 90+% of all pecans shelled are soaked in water before shelling [5].

The average moisture content of pecan shells varies from 11.3% for dry shelled pecans to 15-16% for “rewet” pecans. Harvesting pecans occurs from mid-October through November, and occasionally into December [7].

Current pecan shell uses are (1) air blasting material to strip old paint from metal, (2) filler material in drilling mud used in the oil fields, (3) roughage supplement in cattle feed, (4) particle board manufacture, and (5) landscape mulch-decoration. In reality, there are virtually no markets for pecan shells. Thus for this study it was assumed that 95 percent of the pecan shells would be available. This study found that there was over 26,000 tons of pecan shells generated annually in Georgia (Table A-5).

Paper Mill Sludge

Paper mill sludge (also called bio-solids) is generated from the manufacture of paper. “Wastewater treatment plant sludge is those solid materials collected in the process of treating water used in the mill prior to its release in the environment. Typically, these materials consist of solids collected in primary treatment (separation of solids from raw wastewater) and secondary

treatment (biological treatment followed by clarification to separate sludge). Often primary and secondary residuals are combined to facilitate handling.” A nationwide industry survey found that in terms of dry tonnage *as managed*, 54% was combined (primary and secondary), 40% was primary alone, 5% was intermittently dredged material, and 1% was secondary alone [8].

Sludge exits the treatment process as a slurry with a low solids content; therefore, some level of dewatering must be performed before it can be used for fuel. The previously mentioned survey found that the most common method of dewatering is with a belt filter press (50%) followed by a screw press (36%); however, the use of screw presses has nearly doubled since 1988. Filter presses obtained sludge with a 70% moisture content and screw presses, 60%. Disposal was by land filling or lagoons (51%), land application (12%), incineration (26%), other beneficial uses (5.5%), and reuse or recycle in the process, 5.6% [8]. Based on this information, for this study it was assumed that 95 percent of the sludge would be available. This study found that almost 400,000 tons of paper mill sludge is generated in Georgia annually (Table A-6).

Because of its high ash and moisture content, use for fuel is basically a disposal mechanism for paper companies. Because sludge disposal is a problem, a tipping fee is usually associated with its availability. Disposal in landfills must be in Subtitle D landfills, the same as MSW. However, many Subtitle D landfills will not accept sludge. Because of the general decline of the pulp and paper industry, the amount of paper mill sludge will probably decrease some in the future.

Black Liquor

The two main pulping processes are chemical and mechanical. In the chemical process, the lignin in the wood is dissolved in a digester for several hours. After the fibers are removed from this process, the material left over (which contains undersize wood fibers, lignin, and process chemicals) is called pulping liquor or black liquor. The black liquor yield is equal to 40-50% (bleached) and 50-65% (unbleached) of the incoming wood [9]. To recover the chemicals, black liquor is combusted in special boilers and steam generated to provide process heat and electricity for the plant. This resource makes up the largest contributor to power generation for biomass in the United States [10]. Because black liquor is burned to recover the energy and chemicals, none of it was assumed as available for this study.

The water content of black liquor varies from mill to mill, depending upon the type and age of evaporator/concentrator system that the mill has. The average moisture content on wet black liquor is 25% to 35%. All information provided in Table A-8 is in dry tons of black liquor solids. Heating value of the black liquor varies from mill to mill, depending upon the type of wood pulped, the pulp yield, pulping conditions, and other variables. The range is from about 5900 Btu/lb of black liquor solids to 6500 Btu/lb; these values are before recycled boiler ash is mixed with the black liquor [11]. Table A-7 calculates dry tons of black liquor solids produced annually on a county level basis.

CRP Potential

The State of Georgia currently has 7,459,575 acres of crop land throughout the entire state. Through the CRP Program only 25% of the land in each county can be registered in CRP or WRP Programs. This percentage is regulated by law to minimize the CRP programs affects on local agri-business. Georgia currently has 307,825 acres actively enrolled in CRP, which leaves an additional 1,864,893 acres that could become potential CRP land [12]. This land could have trees, grasses, or any other resource planted on it that is designated by the contract. Once under

contract, this land cannot be commercially harvested unless there are extenuating circumstances (i.e. drought and farmers need the hay, research, etc.). However, often CRP land is harvested once the CRP contract expires. Assuming 1.5 dry tons/acre/year these additional CRP acres could potentially provide up to 1,398,669 dry tons/acre/per year of wood resources if 50% of the additional CRP land were planted in trees. Since this resource is considered potential whereas the other resources assessed in this report are existing, the totals potentially available from CRP land was not included in the overall summary.

SUMMARY

Several factors go into selection of feedstocks. This report summarizes the amount of selected forestry-related resources available in dry tons. In some cases little of the feedstock is actually available. Also, some feedstocks may have high moisture and/or ash contents or other factors that may limit their energy value and increase transportation and ash disposal costs. Other feedstocks may have characteristics that make them difficult to handle or process. For example, bark may be stringy and urban wood waste may have non-wood materials commingled with it. Table 1 is a summary of all wood resources in Georgia assessed by this study.

Table 1. Wood Resources Generated and Amount Unutilized

Wood Resources	Units	Amount Generated	% Unutilized	Amount Available
Unmerchantable Timber (20 year Growth Cycle)	dry tons	13,260,175	100%	13,260,175
Harvesting Residues	dry tons	5,314,287	95%	5,048,572
Mill Residues	dry tons	7,970,276	1%	79,703
Urban Wood Waste @ \$12.50/dt	dry tons	86,209	100%	86,209
Pecan Shells	dry tons	22,297	95%	21,182
Paper Mill Sludge	dry tons	395,210	95%	375,449
Black Liquor Production	dry tons	12,066,840	0%	-
TOTAL		39,115,295		18,871,292

Of the resources surveyed, 18,871,292 dry tons are currently known available resources. This number primarily contains unmerchantable standing timber and unutilized harvesting residues. The percentages of other resources that are unutilized would require further research. Table A-8 is a summary on a county level basis for all wood resources assessed by this study.

REFERENCES

1. Wells, John, 2002, Utilization and Marketing Forester, Georgia Forestry Commission, Macon, Georgia, personal communication.
2. Allen, Fred, 2002, State Forester, Georgia Forestry Commission, Macon, Georgia, personal communication.
3. Carson, Dean, 2002, Utilization and Marketing Forester, South Carolina Forestry Commission, Columbia, South Carolina, personal communication.
4. Nix, Steve, 2002, Utilization and Marketing Forester, Alabama Forestry Commission, Montgomery, Alabama, personal communication.
5. Sparks, Daryl, 2002, University of Georgia Department of Horticulture, Athens, Georgia, personal communication.
6. ag.arizona.edu/pubs/crops/az1178/az1178-13.pdf
7. Sumner, Paul E., 2002, University of Georgia, Extension Engineer, Biological and Agricultural Engineering Extension Unit, Tifton, Georgia, personal communication.
8. *Solid Waste Management Practices in the US Paper Industry-1995*, Technical Bulletin No. 793, National Council for Air and Stream Improvement, Kalamazoo, Michigan
9. Nilsson, L.J., Larson, E.D., Gilbreath, K.R., and Gupta, A., 1995. Energy Efficiency and the Pulp and Paper Industry, ACEEE, Washington D.C./Berkeley, USA.
10. United States Department of Energy, Energy Efficiency and Renewable Energy, Biomass Program, Black Liquor Gasification.
11. Fredrick, Jim, Director of IPST, 2005, Georgia Institute of Technology, Institute of Paper Science & Technology, personal communication, June
12. Harte, Paul, Automation Specialist, 2005, Farm Service Agency, Kansas City, MO, personal communication, September

APPENDIX I
TABLES A-1—A-8

LIST OF TABLES
(All Tables Are County Level Data For The State Of Georgia)

Table A-1	Unmerchantable Standing Timber
Table A-2	Harvesting Residues
Table A-3	Mill Residues: Amounts Generated Bark, Coarse, Fine, and Unutilized
Table A-4	Urban Wood Waste: Dry Tons Available at Various Prices
Table A-5	Pecan Shells
Table A-6	Paper Mill Sludge
Table A-7	Black Liquor Production
Table A-8	Georgia Combined Wood Resource Assessment Chart

Table A-1. Annual Unmerchantable Timber Calculated with a 20 and 30 Growth Year Cycle.

County	All Live Biomass on Timberland	All Live Merchantable Biomass on Timberland	Unmerchantable standing timber	Growth Cycle (1)	Growth Cycle (2)	Unmerchantable standing timber (Growth Cycle 1)	Unmerchantable standing timber (Growth Cycle 2)
	<i>dry tons</i>	<i>dry tons</i>	<i>dry tons</i>	<i>year</i>	<i>year</i>	<i>dry tons/year</i>	<i>dry tons/year</i>
Appling	9,180,262	6,639,525	2,540,737	30	20	84,691	127,037
Atkinson	4,798,502	3,129,954	1,668,548	30	20	55,618	83,427
Bacon	4,580,111	3,183,016	1,397,095	30	20	46,570	69,855
Baker	5,003,896	3,824,358	1,179,538	30	20	39,318	58,977
Baldwin	4,101,154	2,961,659	1,139,495	30	20	37,983	56,975
Banks	5,212,278	3,910,305	1,301,973	30	20	43,399	65,099
Barrow	2,689,621	2,066,560	623,061	30	20	20,769	31,153
Bartow	5,926,585	4,100,890	1,825,695	30	20	60,857	91,285
Ben Hill	3,478,671	2,325,508	1,153,163	30	20	38,439	57,658
Berrien	6,078,793	4,248,392	1,830,401	30	20	61,013	91,520
Bibb	3,354,910	2,295,655	1,059,255	30	20	35,309	52,963
Bleckley	4,000,187	2,972,815	1,027,372	30	20	34,246	51,369
Brantley	7,227,452	4,776,859	2,450,593	30	20	81,686	122,530
Brooks	7,051,899	4,915,631	2,136,268	30	20	71,209	106,813
Bryan	9,514,401	6,827,058	2,687,343	30	20	89,578	134,367
Bulloch	8,919,719	6,571,216	2,348,503	30	20	78,283	117,425
Burke	14,126,404	10,411,208	3,715,196	30	20	123,840	185,760
Butts	3,273,246	2,410,989	862,257	30	20	28,742	43,113
Calhoun	2,628,643	1,752,118	876,525	30	20	29,218	43,826
Camden	12,788,413	9,382,717	3,405,696	30	20	113,523	170,285
Candler	2,645,197	1,799,872	845,325	30	20	28,178	42,266
Carroll	8,822,448	6,495,656	2,326,792	30	20	77,560	116,340
Catoosa	2,279,496	1,760,470	519,026	30	20	17,301	25,951
Charlton	9,803,235	6,386,135	3,417,100	30	20	113,903	170,855
Chatham	5,632,130	4,314,655	1,317,475	30	20	43,916	65,874
Chattahoochee	4,701,510	3,443,194	1,258,316	30	20	41,944	62,916
Chattooga	5,622,967	3,905,902	1,717,065	30	20	57,236	85,853
Cherokee	10,281,746	7,871,627	2,410,119	30	20	80,337	120,506
Clarke	1,389,505	1,050,030	339,475	30	20	11,316	16,974
Clay	3,126,810	2,197,591	929,219	30	20	30,974	46,461
Clayton	1,213,163	893,409	319,754	30	20	10,658	15,988
Clinch	14,849,804	9,272,391	5,577,413	30	20	185,914	278,871
Cobb	3,804,602	3,133,778	670,824	30	20	22,361	33,541
Coffee	7,752,127	5,332,360	2,419,767	30	20	80,659	120,988
Colquitt	6,019,508	4,721,833	1,297,675	30	20	43,256	64,884
Columbia	6,790,645	5,248,104	1,542,541	30	20	51,418	77,127
Cook	3,469,340	2,509,791	959,549	30	20	31,985	47,977
Coweta	8,418,887	6,241,754	2,177,133	30	20	72,571	108,857
Crawford	5,250,596	3,598,914	1,651,682	30	20	55,056	82,584
Crisp	3,575,827	2,691,458	884,369	30	20	29,479	44,218
Dade	4,299,787	3,275,153	1,024,634	30	20	34,154	51,232
Dawson	6,277,830	4,727,606	1,550,224	30	20	51,674	77,511
De Kalb	7,739,473	5,953,391	1,786,082	30	20	59,536	89,304
Decatur	2,010,769	1,618,522	392,247	30	20	13,075	19,612
Dodge	8,762,584	6,461,582	2,301,002	30	20	76,700	115,050
Dooly	5,038,051	3,528,333	1,509,718	30	20	50,324	75,486

Dougherty	5,435,931	4,218,871	1,217,060	30	20	40,569	60,853
Douglas	5,044,758	3,982,538	1,062,220	30	20	35,407	53,111
Early	5,333,808	4,031,326	1,302,482	30	20	43,416	65,124
Echols	7,120,486	4,782,356	2,338,130	30	20	77,938	116,907
Effingham	9,065,577	6,387,255	2,678,322	30	20	89,277	133,916
Elbert	6,884,686	5,017,819	1,866,867	30	20	62,229	93,343
Emanuel	12,349,382	9,048,644	3,300,738	30	20	110,025	165,037
Evans	3,914,852	3,000,979	913,873	30	20	30,462	45,694
Fannin	10,062,355	7,430,325	2,632,030	30	20	87,734	131,602
Fayette	3,480,030	2,576,367	903,663	30	20	30,122	45,183
Floyd	8,114,208	5,800,203	2,314,005	30	20	77,134	115,700
Forsyth	2,941,997	2,260,130	681,867	30	20	22,729	34,093
Franklin	3,555,924	2,642,977	912,947	30	20	30,432	45,647
Fulton	7,852,136	6,188,700	1,663,436	30	20	55,448	83,172
Gilmer	14,071,142	10,696,735	3,374,407	30	20	112,480	168,720
Glascock	2,654,194	1,948,217	705,977	30	20	23,533	35,299
Glynn	6,501,274	4,812,726	1,688,548	30	20	56,285	84,427
Gordon	3,695,459	2,570,623	1,124,836	30	20	37,495	56,242
Grady	6,130,707	4,575,818	1,554,889	30	20	51,830	77,744
Greene	7,415,014	5,346,596	2,068,418	30	20	68,947	103,421
Gwinnett	4,963,915	3,852,298	1,111,617	30	20	37,054	55,581
Habersham	8,178,684	6,254,665	1,924,019	30	20	64,134	96,201
Hall	7,291,657	5,421,949	1,869,708	30	20	62,324	93,485
Hancock	8,926,635	6,270,491	2,656,144	30	20	88,538	132,807
Haralson	5,503,717	4,090,739	1,412,978	30	20	47,099	70,649
Harris	9,338,619	6,642,946	2,695,673	30	20	89,856	134,784
Hart	2,910,524	2,270,470	640,054	30	20	21,335	32,003
Heard	4,837,191	3,330,996	1,506,195	30	20	50,207	75,310
Henry	5,226,860	3,966,277	1,260,583	30	20	42,019	63,029
Houston	6,294,151	4,608,491	1,685,660	30	20	56,189	84,283
Irwin	4,708,431	3,523,345	1,185,086	30	20	39,503	59,254
Jackson	5,705,895	4,143,114	1,562,781	30	20	52,093	78,139
Jasper	8,693,379	6,377,232	2,316,147	30	20	77,205	115,807
Jeff Davis	4,076,674	2,684,671	1,392,003	30	20	46,400	69,600
Jefferson	8,922,677	6,692,585	2,230,092	30	20	74,336	111,505
Jenkins	5,024,737	3,671,629	1,353,108	30	20	45,104	67,655
Johnson	4,576,255	3,242,843	1,333,412	30	20	44,447	66,671
Jones	7,667,452	5,378,471	2,288,981	30	20	76,299	114,449
Lamar	2,367,374	1,585,477	781,897	30	20	26,063	39,095
Lanier	4,162,628	3,100,963	1,061,665	30	20	35,389	53,083
Laurens	11,447,347	7,972,730	3,474,617	30	20	115,821	173,731
Lee	4,267,900	3,297,618	970,282	30	20	32,343	48,514
Liberty	10,242,820	7,987,604	2,255,216	30	20	75,174	112,761
Lincoln	4,413,108	3,340,600	1,072,508	30	20	35,750	53,625
Long	12,027,085	8,582,860	3,444,225	30	20	114,808	172,211
Lowndes	7,002,121	5,063,808	1,938,313	30	20	64,610	96,916
Lumpkin	9,213,913	6,882,383	2,331,530	30	20	77,718	116,577
Macon	5,950,519	4,578,355	1,372,164	30	20	45,739	68,608
Madison	5,031,471	3,412,710	1,618,761	30	20	53,959	80,938
Marion	7,212,399	5,547,638	1,664,761	30	20	55,492	83,238
McDuffie	4,448,755	3,292,013	1,156,742	30	20	38,558	57,837
McIntosh	4,480,197	2,962,267	1,517,930	30	20	50,598	75,897
Meriwether	9,064,306	6,521,928	2,542,378	30	20	84,746	127,119

Miller	2,970,417	2,056,910	913,507	30	20	30,450	45,675
Mitchell	3,275,257	2,365,066	910,191	30	20	30,340	45,510
Monroe	6,723,657	4,999,188	1,724,469	30	20	57,482	86,223
Montgomery	3,323,553	2,375,583	947,970	30	20	31,599	47,399
Morgan	6,976,656	5,155,542	1,821,114	30	20	60,704	91,056
Murray	7,824,429	5,716,639	2,107,790	30	20	70,260	105,390
Muscogee	3,050,476	2,176,475	874,001	30	20	29,133	43,700
Newton	5,167,558	4,129,447	1,038,111	30	20	34,604	51,906
Oconee	2,669,055	1,990,082	678,973	30	20	22,632	33,949
Oglethorpe	10,103,590	7,505,699	2,597,891	30	20	86,596	129,895
Paulding	6,735,385	4,916,699	1,818,686	30	20	60,623	90,934
Peach	850,032	617,191	232,841	30	20	7,761	11,642
Pickens	5,426,775	3,789,635	1,637,140	30	20	54,571	81,857
Pierce	5,945,414	4,289,742	1,655,672	30	20	55,189	82,784
Pike	3,595,891	2,554,403	1,041,488	30	20	34,716	52,074
Polk	4,687,032	3,397,484	1,289,548	30	20	42,985	64,477
Pulaski	2,573,579	1,887,284	686,295	30	20	22,877	34,315
Putnam	6,333,496	4,584,535	1,748,961	30	20	58,299	87,448
Quitman	3,113,873	2,052,790	1,061,083	30	20	35,369	53,054
Rabun	14,140,807	10,906,877	3,233,930	30	20	107,798	161,697
Randolph	5,949,748	4,073,327	1,876,421	30	20	62,547	93,821
Richmond	4,098,764	3,001,166	1,097,598	30	20	36,587	54,880
Rockdale	1,849,103	1,460,002	389,101	30	20	12,970	19,455
Schley	2,814,773	2,016,197	798,576	30	20	26,619	39,929
Screven	13,168,133	9,767,866	3,400,267	30	20	113,342	170,013
Seminole	1,630,954	1,261,054	369,900	30	20	12,330	18,495
Spalding	2,860,637	2,109,936	750,701	30	20	25,023	37,535
Stephens	2,917,352	2,125,219	792,133	30	20	26,404	39,607
Stewart	7,158,845	4,571,646	2,587,199	30	20	86,240	129,360
Sumter	5,525,895	3,767,174	1,758,721	30	20	58,624	87,936
Talbot	7,773,753	5,110,099	2,663,654	30	20	88,788	133,183
Taliaferro	4,200,761	3,015,867	1,184,894	30	20	39,496	59,245
Tattnall	5,415,297	3,877,102	1,538,195	30	20	51,273	76,910
Taylor	4,893,768	3,009,272	1,884,496	30	20	62,817	94,225
Telfair	6,661,705	4,622,224	2,039,481	30	20	67,983	101,974
Terelll	3,967,599	2,802,174	1,165,425	30	20	38,848	58,271
Thomas	7,822,364	6,195,240	1,627,124	30	20	54,237	81,356
Tift	2,926,865	2,188,899	737,966	30	20	24,599	36,898
Toombs	3,731,953	2,592,235	1,139,718	30	20	37,991	56,986
Towns	4,629,245	3,506,029	1,123,216	30	20	37,441	56,161
Treutlen	3,471,506	2,685,642	785,864	30	20	26,195	39,293
Troup	9,563,067	7,081,228	2,481,839	30	20	82,728	124,092
Turner	2,292,853	1,654,088	638,765	30	20	21,292	31,938
Twiggs	8,468,609	5,951,091	2,517,518	30	20	83,917	125,876
Union	7,739,589	5,816,212	1,923,377	30	20	64,113	96,169
Upton	6,189,517	4,418,680	1,770,837	30	20	59,028	88,542
Walker	9,497,211	7,088,477	2,408,734	30	20	80,291	120,437
Walton	5,377,253	4,182,579	1,194,674	30	20	39,822	59,734
Ware	11,422,143	7,424,001	3,998,142	30	20	133,271	199,907
Warren	6,291,337	4,746,742	1,544,595	30	20	51,487	77,230
Washington	10,780,566	7,650,554	3,130,012	30	20	104,334	156,501
Wayne	9,141,492	6,226,078	2,915,414	30	20	97,180	145,771
Webster	2,467,716	1,523,231	944,485	30	20	31,483	47,224

Wheeler	6,615,268	4,841,924	1,773,344	30	20	59,111	88,667
White	7,118,913	5,351,110	1,767,803	30	20	58,927	88,390
Whitfield	3,929,925	2,987,888	942,037	30	20	31,401	47,102
Wilcox	6,571,876	4,676,593	1,895,283	30	20	63,176	94,764
Wilkes	8,749,655	6,398,824	2,350,831	30	20	78,361	117,542
Wilkinson	9,346,615	6,512,091	2,834,524	30	20	94,484	141,726
Worth	9,465,295	7,329,499	2,135,796	30	20	71,193	106,790
Total	969,301,356	704,097,848	265,203,508	30	20	8,840,117	13,260,175

Table A-2. Harvesting Residues, Volume and Weight of logging residues by county, 2003

County Totals					
	<i>Hardwood</i>	<i>Softwood</i>	Total Hardwood & Softwood		<i>dry tons/year</i>
			<i>thousand cubic feet/year</i>	<i>cubic feet/year</i>	
APPLING	976	3,183	4,159	4,159,000	67,168
ATKINSON	279	1,440	1,719	1,719,000	27,762
BACON	789	1,588	2,377	2,377,000	38,389
BAKER	541	446	987	987,000	15,940
BALDWIN	655	963	1,618	1,618,000	26,131
BANKS	510	647	1,157	1,157,000	18,686
BARROW	96	106	202	202,000	3,262
BARTOW	594	1,466	2,060	2,060,000	33,269
BEN HILL	723	902	1,625	1,625,000	26,244
BERRIEN	324	1,322	1,646	1,646,000	26,583
BIBB	144	407	551	551,000	8,899
BLECKLEY	242	329	571	571,000	9,222
BRANTLEY	431	3,732	4,163	4,163,000	67,232
BROOKS	432	1,508	1,940	1,940,000	31,331
BRYAN	757	1,618	2,375	2,375,000	38,356
BULLOCH	1,013	2,440	3,453	3,453,000	55,766
BURKE	3,272	2,740	6,012	6,012,000	97,094
BUTTS	552	500	1,052	1,052,000	16,990
CALHOUN	665	692	1,357	1,357,000	21,916
CAMDEN	185	3,373	3,558	3,558,000	57,462
CANDLER	339	1,109	1,448	1,448,000	23,385
CARROLL	710	2,501	3,211	3,211,000	51,858
CATOOSA	344	58	402	402,000	6,492
CHARLTON	5	3,149	3,154	3,154,000	50,937
CHATHAM	973	1,713	2,686	2,686,000	43,379
CHATTAHOOCHEE	709	707	1,416	1,416,000	22,868
CHATTOOGA	267	892	1,159	1,159,000	18,718
CHEROKEE	356	1,797	2,153	2,153,000	34,771
CLARKE	12	68	80	80,000	1,292
CLAY	367	930	1,297	1,297,000	20,947
CLAYTON	347	148	495	495,000	7,994
CLINCH	831	5,484	6,315	6,315,000	101,987
COBB	90	86	176	176,000	2,842
COFFEE	613	1,783	2,396	2,396,000	38,695
COLQUITT	165	2,251	2,416	2,416,000	39,018
COLUMBIA	831	944	1,775	1,775,000	28,666
COOK	51	401	452	452,000	7,300
COWETA	642	2,238	2,880	2,880,000	46,512
CRAWFORD	1,230	1,072	2,302	2,302,000	37,177
CRISP	680	612	1,292	1,292,000	20,866
DADE	274	173	447	447,000	7,219
DAWSON	146	424	570	570,000	9,206
DECATUR	1,390	2,561	3,951	3,951,000	63,809
DEKALB	158	86	244	244,000	3,941
DODGE	1,957	2,200	4,157	4,157,000	67,136
DOOLY	404	1,857	2,261	2,261,000	36,515

DOUGHERTY	813	543	1,356	1,356,000	21,899
DOUGLAS	135	180	315	315,000	5,087
EARLY	747	1,398	2,145	2,145,000	34,642
ECHOLS	254	2,330	2,584	2,584,000	41,732
EFFINGHAM	1,193	2,491	3,684	3,684,000	59,497
ELBERT	1,293	768	2,061	2,061,000	33,285
EMANUEL	1,956	3,137	5,093	5,093,000	82,252
EVANS	488	836	1,324	1,324,000	21,383
FANNIN	661	255	916	916,000	14,793
FAYETTE	446	298	744	744,000	12,016
FLOYD	709	3,185	3,894	3,894,000	62,888
FORSYTH	357	409	766	766,000	12,371
FRANKLIN	63	339	402	402,000	6,492
FULTON	513	1,425	1,938	1,938,000	31,299
GILMER	260	395	655	655,000	10,578
GLASCOCK	622	554	1,176	1,176,000	18,992
GLYNN	84	2,713	2,797	2,797,000	45,172
GORDON	393	506	899	899,000	14,519
GRADY	843	1,468	2,311	2,311,000	37,323
GREENE	606	1,916	2,522	2,522,000	40,730
GWINNETT	592	790	1,382	1,382,000	22,319
HABERSHAM	820	717	1,537	1,537,000	24,823
HALL	138	584	722	722,000	11,660
HANCOCK	2,343	2,531	4,874	4,874,000	78,715
HARALSON	266	1,089	1,355	1,355,000	21,883
HARRIS	845	1,929	2,774	2,774,000	44,800
HART	85	100	185	185,000	2,988
HEARD	254	2,307	2,561	2,561,000	41,360
HENRY	664	958	1,622	1,622,000	26,195
HOUSTON	387	1,252	1,639	1,639,000	26,470
IRWIN	184	969	1,153	1,153,000	18,621
JACKSON	107	742	849	849,000	13,711
JASPER	570	1,163	1,733	1,733,000	27,988
JEFF DAVIS	5,589	2,290	7,879	7,879,000	127,246
JEFFERSON	3,371	2,263	5,634	5,634,000	90,989
JENKINS	1,124	2,168	3,292	3,292,000	53,166
JOHNSON	1,827	1,538	3,365	3,365,000	54,345
JONES	606	1,213	1,819	1,819,000	29,377
LAMAR	348	361	709	709,000	11,450
LANIER	1	876	877	877,000	14,164
LAURENS	1,733	2,216	3,949	3,949,000	63,776
LEE	1,032	946	1,978	1,978,000	31,945
LIBERTY	1,176	2,168	3,344	3,344,000	54,006
LINCOLN	368	1,023	1,391	1,391,000	22,465
LONG	1,569	2,726	4,295	4,295,000	69,364
LOWNDES	422	1,729	2,151	2,151,000	34,739
LUMPKIN	210	282	492	492,000	7,946
MCDUFFIE	505	1,129	1,634	1,634,000	26,389
MCINTOSH	658	1,319	1,977	1,977,000	31,929
MACON	1,294	1,444	2,738	2,738,000	44,219
MADISON	67	992	1,059	1,059,000	17,103
MARION	529	1,756	2,285	2,285,000	36,903
MERIWETHER	825	1,606	2,431	2,431,000	39,261

MILLER	146	238	384	384,000	6,202
MITCHELL	1,046	1,755	2,801	2,801,000	45,236
MONROE	1,283	1,949	3,232	3,232,000	52,197
MONTGOMERY	914	1,169	2,083	2,083,000	33,640
MORGAN	407	1,612	2,019	2,019,000	32,607
MURRAY	976	772	1,748	1,748,000	28,230
MUSCOGEE	465	917	1,382	1,382,000	22,319
NEWTON	276	601	877	877,000	14,164
OCONEE	98	542	640	640,000	10,336
OGLETHORPE	962	2,139	3,101	3,101,000	50,081
PAULDING	841	1,456	2,297	2,297,000	37,097
PEACH	-	261	261	261,000	4,215
PICKENS	137	932	1,069	1,069,000	17,264
PIERCE	590	1,522	2,112	2,112,000	34,109
PIKE	338	400	738	738,000	11,919
POLK	276	1,354	1,630	1,630,000	26,325
PULASKI	558	857	1,415	1,415,000	22,852
PUTNAM	446	1,412	1,858	1,858,000	30,007
QUITMAN	276	654	930	930,000	15,020
RABUN	116	114	230	230,000	3,715
RANDOLPH	1,502	1,716	3,218	3,218,000	51,971
RICHMOND	1,199	537	1,736	1,736,000	28,036
ROCKDALE	14	126	140	140,000	2,261
SCHLEY	439	1,096	1,535	1,535,000	24,790
SCREVEN	1,885	3,495	5,380	5,380,000	86,887
SEMINOLE	130	712	842	842,000	13,598
SPALDING	68	226	294	294,000	4,748
STEPHENS	514	298	812	812,000	13,114
STEWART	2,133	2,530	4,663	4,663,000	75,307
SUMTER	2,075	1,488	3,563	3,563,000	57,542
TALBOT	892	1,401	2,293	2,293,000	37,032
TALIAFERRO	531	1,214	1,745	1,745,000	28,182
TATTNALL	724	1,092	1,816	1,816,000	29,328
TAYLOR	1,929	1,077	3,006	3,006,000	48,547
TELFAIR	1,218	2,578	3,796	3,796,000	61,305
TERRELL	1,074	1,204	2,278	2,278,000	36,790
THOMAS	871	2,300	3,171	3,171,000	51,212
TIFT	352	461	813	813,000	13,130
TOOMBS	859	2,114	2,973	2,973,000	48,014
TOWNS	29	23	52	52,000	840
TREUTLEN	410	1,424	1,834	1,834,000	29,619
TROUP	1,501	1,019	2,520	2,520,000	40,698
TURNER	83	799	882	882,000	14,244
TWIGGS	874	1,098	1,972	1,972,000	31,848
UNION	201	103	304	304,000	4,910
UPSON	279	954	1,233	1,233,000	19,913
WALKER	352	803	1,155	1,155,000	18,653
WALTON	101	473	574	574,000	9,270
WARE	168	3,619	3,787	3,787,000	61,160
WARREN	1,683	1,987	3,670	3,670,000	59,271
WASHINGTON	3,588	2,954	6,542	6,542,000	105,653
WAYNE	669	4,189	4,858	4,858,000	78,457
WEBSTER	801	1,530	2,331	2,331,000	37,646

WHEELER	1,107	1,596	2,703	2,703,000	43,653
WHITE	291	360	651	651,000	10,514
WHITFIELD	779	670	1,449	1,449,000	23,401
WILCOX	461	1,894	2,355	2,355,000	38,033
WILKES	2,385	2,685	5,070	5,070,000	81,881
WILKINSON	1,825	1,436	3,261	3,261,000	52,665
WORTH	194	1,796	1,990	1,990,000	32,139
Total	116,357	212,701	329,058	329,058,000	5,314,287

Table A- 3. Mill Residues, 2003

<i>Mill Residue Categories</i>				
County	bark (dry tons/yr)	wood residue: coarse (dry tons/yr)	wood residue: fines (dry tons/yr)	Amount Unutilized County Total (dry tons/yr)
Appling	69,000	147,000	113,000	329,000
Atkinson	-	-	-	-
Bacon	-	-	-	-
Baker	-	-	-	-
Baldwin	-	-	-	-
Banks	-	-	-	-
Barrow	-	-	-	-
Bartow	-	-	-	-
Ben Hill	54,000	115,000	79,000	248,000
Berrien	-	-	-	-
Bibb	-	-	-	-
Bleckley	-	-	-	-
Brantley	38,000	128,000	99,000	265,000
Brooks	-	-	-	-
Bryan	-	-	-	-
Bulloch	44,000	128,000	117,000	289,000
Burke	-	-	-	-
Butts	-	-	-	-
Calhoun	-	-	-	-
Camden	-	-	-	-
Candler	-	-	-	-
Carroll	1,000	3,000	2,000	6,000
Catoosa	-	-	-	-
Charlton	-	-	-	-
Chatham	149,000	2,000	2,000	153,000
Chattahoochee	-	-	-	-
Chattooga	-	-	-	-
Cherokee	-	-	-	-
Clarke	-	-	-	-
Clay	-	-	-	-
Clayton	-	-	-	-
Clinch	25,000	53,000	23,000	101,000
Cobb	-	-	-	-
Coffee	-	-	-	-
Colquitt	-	-	-	-
Columbia	-	-	-	-
Cook	5,000	16,000	10,000	31,000
Coweta	-	-	-	-
Crawford	-	-	-	-
Crisp	90,000	22,000	21,000	133,000

Dade	-	-	-	-
Dawson	-	-	-	-
De Kalb	-	-	-	-
Decatur	-	-	-	-
Dodge	25,000	14,000	11,000	50,000
Dooly	-	-	-	-
Dougherty	-	-	-	-
Douglas	-	-	-	-
Early	157,000	-	-	157,000
Echols	-	-	-	-
Effingham	26,000	90,000	68,000	184,000
Elbert	-	-	-	-
Emanuel	57,000	128,000	109,000	294,000
Evans	-	-	-	-
Fannin	1,000	3,000	3,000	7,000
Fayette	-	-	-	-
Floyd	177,000	115,000	94,000	386,000
Forsyth	-	-	-	-
Franklin	-	-	-	-
Fulton	-	-	-	-
Gilmer	5,000	16,000	8,000	29,000
Glascocock	-	-	-	-
Glynn	-	-	-	-
Gordon	-	-	-	-
Grady	11,000	29,000	25,000	65,000
Greene	-	-	-	-
Gwinnett	-	-	-	-
Habersham	3,000	7,000	5,000	15,000
Hall	1,000	2,000	1,000	4,000
Hancock	-	-	-	-
Haralson	-	-	-	-
Harris	-	-	-	-
Hart	-	-	-	-
Heard	-	-	-	-
Henry	-	-	-	-
Houston	-	-	-	-
Irwin	-	-	-	-
Jackson	-	-	-	-
Jasper	65,000	222,000	172,000	459,000
Jeff Davis	32,000	71,000	68,000	171,000
Jefferson	29,000	78,000	55,000	162,000
Jenkins	-	-	-	-
Johnson	-	-	-	-
Jones	-	-	-	-
Lamar	-	-	-	-
Lanier	-	-	-	-
Laurens	20,000	69,000	54,000	143,000

Lee	-	-	-	-
Liberty	151,000	7,000	6,000	164,000
Lincoln	-	-	-	-
Long	-	-	-	-
Lowndes	160,000	95,000	85,000	340,000
Lumpkin	2,000	4,000	4,000	10,000
Macon	89,000	59,000	56,000	204,000
Madison	131,000	23,000	30,000	184,000
Marion	-	-	-	-
McDuffie	-	-	-	-
McIntosh	-	-	-	-
Meriwether	49,000	131,000	127,000	307,000
Miller	-	-	-	-
Mitchell	-	-	-	-
Monroe	84,000	30,000	21,000	135,000
Montgomery	-	-	-	-
Morgan	-	-	-	-
Murray	-	-	-	-
Muscogee	-	-	-	-
Newton	-	-	-	-
Oconee	-	-	-	-
Oglethorpe	-	-	-	-
Paulding	-	-	-	-
Peach	-	-	-	-
Pickens	-	-	-	-
Pierce	148,000	100,000	62,000	310,000
Pike	-	-	-	-
Polk	-	-	-	-
Pulaski	-	-	-	-
Putnam	28,000	86,000	65,000	179,000
Quitman	-	-	-	-
Rabun	-	-	-	-
Randolph	-	-	-	-
Richmond	139,000	106,000	97,000	342,000
Rockdale	-	-	-	-
Schley	-	-	-	-
Screven	2,000	5,000	3,000	10,000
Seminole	-	-	-	-
Spalding	-	-	-	-
Stephens	-	-	-	-
Stewart	-	-	-	-
Sumter	-	-	-	-
Talbot	-	-	-	-
Taliaferro	-	-	-	-
Tattnall	-	-	-	-
Taylor	-	-	-	-
Telfair	-	-	-	-

Terell	-	-	-	-
Thomas	61,000	139,000	104,000	304,000
Tift	-	-	-	-
Toombs	31,000	13,000	3,000	47,000
Towns	-	-	-	-
Treutlen	-	-	-	-
Troup	-	-	-	-
Turner	-	-	-	-
Twiggs	-	-	-	-
Union	-	-	-	-
Upson	37,000	125,000	99,000	261,000
Walker	-	-	-	-
Walton	-	-	-	-
Ware	-	-	-	-
Warren	28,000	90,000	70,000	188,000
Washington	-	-	-	-
Wayne	-	-	-	-
Webster	27,000	68,000	65,000	160,000
Wheeler	-	-	-	-
White	6,000	19,000	14,000	39,000
Whitfield	6,000	15,000	13,000	34,000
Wilcox	-	-	-	-
Wilkes	7,000	21,000	17,000	45,000
Wilkinson	9,000	24,000	16,000	49,000
Worth	-	-	-	-
Total	2,279,000	2,618,000	2,096,000	6,993,000

Reference: Timber Product Output (TPO) Reports, Forest Inventory and Analysis,
Southern Research Station, USDA Forest Service

Table A-4. Georgia Urban Wood Waste Supply Curve

Counties	7/1/1999		Dry tons available at different prices				
	Estimate		Qty @ \$12.50/dt	Qty @ \$15/dt	Qty @ \$20/dt	Qty @ \$25/dt	Qty @ \$30/dt
	7,788,240		86,209	172,419	862,094	1,149,459	1,436,823
APPLING	16,675	0.00	185	369	1,846	2,461	3,076
ATKINSON	7,295	0.00	81	161	807	1,077	1,346
BACON	10,365	0.00	115	229	1,147	1,530	1,912
BAKER	3,617	0.00	40	80	400	534	667
BALDWIN	42,181	0.01	467	934	4,669	6,225	7,782
BANKS	13,166	0.00	146	291	1,457	1,943	2,429
BARROW	41,891	0.01	464	927	4,637	6,183	7,728
BARTOW	74,607	0.01	826	1,652	8,258	11,011	13,764
BEN HILL	17,474	0.00	193	387	1,934	2,579	3,224
BERRIEN	16,529	0.00	183	366	1,830	2,439	3,049
BIBB	155,441	0.02	1,721	3,441	17,206	22,941	28,677
BLECKLEY	11,314	0.00	125	250	1,252	1,670	2,087
BRANTLEY	13,895	0.00	154	308	1,538	2,051	2,563
BROOKS	16,122	0.00	178	357	1,785	2,379	2,974
BRYAN	24,394	0.00	270	540	2,700	3,600	4,500
BULLOCH	50,777	0.01	562	1,124	5,621	7,494	9,368
BURKE	23,217	0.00	257	514	2,570	3,427	4,283
BUTTS	18,380	0.00	203	407	2,035	2,713	3,391
CALHOUN	4,936	0.00	55	109	546	728	911
CAMDEN	47,032	0.01	521	1,041	5,206	6,941	8,677
CANDLER	8,953	0.00	99	198	991	1,321	1,652
CARROLL	84,765	0.01	938	1,877	9,383	12,510	15,638
CATOOSA	52,100	0.01	577	1,153	5,767	7,689	9,612
CHARLTON	9,462	0.00	105	209	1,047	1,396	1,746
CHATHAM	225,662	0.03	2,498	4,996	24,979	33,305	41,632
CHATTAHOOCHEE	16,654	0.00	184	369	1,843	2,458	3,072
CHATTOOGA	22,858	0.00	253	506	2,530	3,374	4,217
CHEROKEE	141,686	0.02	1,568	3,137	15,683	20,911	26,139
CLARKE	90,638	0.01	1,003	2,007	10,033	13,377	16,721
CLAY	3,524	0.00	39	78	390	520	650
CLAYTON	213,727	0.03	2,366	4,732	23,658	31,544	39,430
CLINCH	6,677	0.00	74	148	739	985	1,232
COBB	583,541	0.07	6,459	12,919	64,593	86,124	107,655
COFFEE	34,958	0.00	387	774	3,870	5,159	6,449
COLQUITT	40,724	0.01	451	902	4,508	6,010	7,513
COLUMBIA	93,312	0.01	1,033	2,066	10,329	13,772	17,215
COOK	15,197	0.00	168	336	1,682	2,243	2,804
COWETA	89,401	0.01	990	1,979	9,896	13,195	16,493
CRAWFORD	10,414	0.00	115	231	1,153	1,537	1,921
CRISP	20,637	0.00	228	457	2,284	3,046	3,807
DADE	15,344	0.00	170	340	1,698	2,265	2,831
DAWSON	15,945	0.00	176	353	1,765	2,353	2,942
DE KALB	596,853	0.08	6,607	13,213	66,067	88,089	110,111
DECATUR	27,128	0.00	300	601	3,003	4,004	5,005
DODGE	18,146	0.00	201	402	2,009	2,678	3,348
DOOLY	10,433	0.00	115	231	1,155	1,540	1,925
DOUGHERTY	94,080	0.01	1,041	2,083	10,414	13,885	17,356

DOUGLAS	91,175	0.01	1,009	2,018	10,092	13,456	16,821
EARLY	12,127	0.00	134	268	1,342	1,790	2,237
ECHOLS	2,534	0.00	28	56	280	374	467
EFFINGHAM	38,370	0.00	425	849	4,247	5,663	7,079
ELBERT	19,363	0.00	214	429	2,143	2,858	3,572
EMANUEL	21,042	0.00	233	466	2,329	3,106	3,882
EVANS	10,089	0.00	112	223	1,117	1,489	1,861
FANNIN	18,945	0.00	210	419	2,097	2,796	3,495
FAYETTE	92,378	0.01	1,023	2,045	10,225	13,634	17,042
FLOYD	85,512	0.01	947	1,893	9,465	12,621	15,776
FORSYTH	96,686	0.01	1,070	2,140	10,702	14,270	17,837
FRANKLIN	19,311	0.00	214	428	2,138	2,850	3,563
FULTON	744,827	0.10	8,245	16,489	82,446	109,928	137,410
GILMER	19,766	0.00	219	438	2,188	2,917	3,647
GLASCOCK	2,544	0.00	28	56	282	375	469
GLYNN	67,945	0.01	752	1,504	7,521	10,028	12,535
GORDON	41,966	0.01	465	929	4,645	6,194	7,742
GRADY	21,600	0.00	239	478	2,391	3,188	3,985
GREENE	14,094	0.00	156	312	1,560	2,080	2,600
GWINNETT	545,632	0.07	6,040	12,079	60,397	80,529	100,662
HABERSHAM	32,530	0.00	360	720	3,601	4,801	6,001
HALL	123,290	0.02	1,365	2,729	13,647	18,196	22,745
HANCOCK	9,046	0.00	100	200	1,001	1,335	1,669
HARALSON	25,070	0.00	278	555	2,775	3,700	4,625
HARRIS	22,634	0.00	251	501	2,505	3,341	4,176
HART	22,124	0.00	245	490	2,449	3,265	4,082
HEARD	10,490	0.00	116	232	1,161	1,548	1,935
HENRY	113,443	0.01	1,256	2,511	12,557	16,743	20,929
HOUSTON	107,644	0.01	1,192	2,383	11,915	15,887	19,859
IRWIN	9,181	0.00	102	203	1,016	1,355	1,694
JACKSON	39,057	0.01	432	865	4,323	5,764	7,205
JASPER	10,589	0.00	117	234	1,172	1,563	1,954
JEFF DAVIS	12,714	0.00	141	281	1,407	1,876	2,346
JEFFERSON	17,858	0.00	198	395	1,977	2,636	3,295
JENKINS	8,401	0.00	93	186	930	1,240	1,550
JOHNSON	8,293	0.00	92	184	918	1,224	1,530
JONES	23,307	0.00	258	516	2,580	3,440	4,300
LAMAR	15,010	0.00	166	332	1,661	2,215	2,769
LANIER	6,959	0.00	77	154	770	1,027	1,284
LAURENS	43,927	0.01	486	972	4,862	6,483	8,104
LEE	23,341	0.00	258	517	2,584	3,445	4,306
LIBERTY	59,694	0.01	661	1,322	6,608	8,810	11,013
LINCOLN	8,339	0.00	92	185	923	1,231	1,538
LONG	8,709	0.00	96	193	964	1,285	1,607
LOWNDES	85,413	0.01	945	1,891	9,455	12,606	15,758
LUMPKIN	19,772	0.00	219	438	2,189	2,918	3,648
MACON	13,126	0.00	145	291	1,453	1,937	2,422
MADISON	25,208	0.00	279	558	2,790	3,720	4,651
MARION	6,779	0.00	75	150	750	1,001	1,251
MCDUFFIE	21,814	0.00	241	483	2,415	3,220	4,024
MCINTOSH	10,114	0.00	112	224	1,120	1,493	1,866
MERIWETHER	23,043	0.00	255	510	2,551	3,401	4,251
MILLER	6,318	0.00	70	140	699	932	1,166

MITCHELL	21,219	0.00	235	470	2,349	3,132	3,915
MONROE	20,032	0.00	222	443	2,217	2,957	3,696
MONTGOMERY	7,854	0.00	87	174	869	1,159	1,449
MORGAN	15,437	0.00	171	342	1,709	2,278	2,848
MURRAY	33,922	0.00	375	751	3,755	5,007	6,258
MUSCOGEE	182,058	0.02	2,015	4,030	20,152	26,870	33,587
NEWTON	60,583	0.01	671	1,341	6,706	8,941	11,177
OCONEE	24,526	0.00	271	543	2,715	3,620	4,525
OGLETHORPE	11,564	0.00	128	256	1,280	1,707	2,133
PAULDING	79,587	0.01	881	1,762	8,810	11,746	14,683
PEACH	24,996	0.00	277	553	2,767	3,689	4,611
PICKENS	21,024	0.00	233	465	2,327	3,103	3,879
PIERCE	15,804	0.00	175	350	1,749	2,332	2,916
PIKE	13,104	0.00	145	290	1,451	1,934	2,418
POLK	36,627	0.00	405	811	4,054	5,406	6,757
PULASKI	8,359	0.00	93	185	925	1,234	1,542
PUTNAM	18,199	0.00	201	403	2,014	2,686	3,357
QUITMAN	2,449	0.00	27	54	271	361	452
RABUN	13,687	0.00	152	303	1,515	2,020	2,525
RANDOLPH	8,012	0.00	89	177	887	1,182	1,478
RICHMOND	190,310	0.02	2,107	4,213	21,066	28,088	35,110
ROCKDALE	68,968	0.01	763	1,527	7,634	10,179	12,724
SCHLEY	3,949	0.00	44	87	437	583	729
SCREVEN	14,463	0.00	160	320	1,601	2,135	2,668
SEMINOLE	9,803	0.00	109	217	1,085	1,447	1,809
SPALDING	57,825	0.01	640	1,280	6,401	8,534	10,668
STEPHENS	25,332	0.00	280	561	2,804	3,739	4,673
STEWART	5,374	0.00	59	119	595	793	991
SUMTER	31,362	0.00	347	694	3,472	4,629	5,786
TALBOT	6,969	0.00	77	154	771	1,029	1,286
TALIAFERRO	1,924	0.00	21	43	213	284	355
TATNALL	19,171	0.00	212	424	2,122	2,829	3,537
TAYLOR	8,287	0.00	92	183	917	1,223	1,529
TELFAIR	11,406	0.00	126	253	1,263	1,683	2,104
TERRELL	11,205	0.00	124	248	1,240	1,654	2,067
THOMAS	42,896	0.01	475	950	4,748	6,331	7,914
TIFT	36,975	0.00	409	819	4,093	5,457	6,821
TOOMBS	25,990	0.00	288	575	2,877	3,836	4,795
TOWNS	8,800	0.00	97	195	974	1,299	1,623
TREUTLEN	5,933	0.00	66	131	657	876	1,095
TROUP	58,801	0.01	651	1,302	6,509	8,678	10,848
TURNER	9,249	0.00	102	205	1,024	1,365	1,706
TWIGGS	10,198	0.00	113	226	1,129	1,505	1,881
UNION	17,234	0.00	191	382	1,908	2,544	3,179
UPSON	27,079	0.00	300	599	2,997	3,997	4,996
WALKER	62,963	0.01	697	1,394	6,969	9,293	11,616
WALTON	58,498	0.01	648	1,295	6,475	8,634	10,792
WARE	35,232	0.00	390	780	3,900	5,200	6,500
WARREN	6,075	0.00	67	134	672	897	1,121
WASHINGTON	20,198	0.00	224	447	2,236	2,981	3,726
WAYNE	25,610	0.00	283	567	2,835	3,780	4,725
WEBSTER	2,203	0.00	24	49	244	325	406
WHEELER	4,864	0.00	54	108	538	718	897

WHITE	18,195	0.00	201	403	2,014	2,685	3,357
WHITFIELD	83,220	0.01	921	1,842	9,212	12,282	15,353
WILCOX	7,419	0.00	82	164	821	1,095	1,369
WILKES	10,556	0.00	117	234	1,168	1,558	1,947
WILKINSON	10,908	0.00	121	241	1,207	1,610	2,012
WORTH	22,483	0.00	249	498	2,489	3,318	4,148
TOTAL	7,788,240		86,209	172,419	862,094	1,149,459	1,436,823
Source: Marie Walsh, ORNL, Biomass Feedstock Development Program, Oak Ridge, TN							

Table A-5. Georgia Pecan Shells, 2002

Georgia Counties	0.415 lb shell		1200 lb of pecans		
	lb of pecan		acre		
	Bearing Acres	lbs of pecans	lbs of pecan shell	tons of pecan shells	Dry tons/year of pecan shells
Appling	1,073	1,287,600	534,354	267	226
Atkinson	197	236,400	98,106	49	41
Bacon	213	255,600	106,074	53	45
Baker	100	120,000	49,800	25	21
Baldwin	74	88,800	36,852	18	16
Banks		-	-	-	-
Barrow		-	-	-	-
Bartow		-	-	-	-
Ben Hill	210	252,000	104,580	52	44
Berrien	1,699	2,038,800	846,102	423	357
Bibb	336	403,200	167,328	84	71
Bleckley	249	298,800	124,002	62	52
Brantley	153	183,600	76,194	38	32
Brooks	1,836	2,203,200	914,328	457	386
Bryan		-	-	-	-
Bulloch	1,002	1,202,400	498,996	249	211
Burke	637	764,400	317,226	159	134
Butts	107	128,400	53,286	27	23
Calhoun	2,413	2,895,600	1,201,674	601	508
Camden		-	-	-	-
Candler	345	414,000	171,810	86	73
Carroll	15	18,000	7,470	4	3
Catoosa	11	13,200	5,478	3	2
Charlton		-	-	-	-
Chatham		-	-	-	-
Chattahoochee		-	-	-	-
Chattooga		-	-	-	-
Cherokee		-	-	-	-
Clarke		-	-	-	-
Clay		-	-	-	-
Clayton		-	-	-	-
Clinch	25	30,000	12,450	6	5
Cobb		-	-	-	-
Coffee	487	584,400	242,526	121	102
Colquitt	1,262	1,514,400	628,476	314	266
Columbia	51	61,200	25,398	13	11
Cook	279	334,800	138,942	69	59
Coweta	12	14,400	5,976	3	3
Crawford	3,019	3,622,800	1,503,462	752	635
Crisp	3,832	4,598,400	1,908,336	954	806
Dade	738	885,600	367,524	184	155
Dawson		-	-	-	-
De Kalb		-	-	-	-
Decatur		-	-	-	-
Dodge		-	-	-	-

Dooly	2,549	3,058,800	1,269,402	635	536
Dougherty	12,185	14,622,000	6,068,130	3,034	2,564
Douglas		-	-	-	-
Early	497	596,400	247,506	124	105
Echols		-	-	-	-
Effingham		-	-	-	-
Elbert	46	55,200	22,908	11	10
Emanuel	1,346	1,615,200	670,308	335	283
Evans	679	814,800	338,142	169	143
Fannin		-	-	-	-
Fayette		-	-	-	-
Floyd		-	-	-	-
Forsyth		-	-	-	-
Franklin	4	4,800	1,992	1	1
Fulton		-	-	-	-
Gilmer		-	-	-	-
Glascocock	21	25,200	10,458	5	4
Glynn		-	-	-	-
Gordon		-	-	-	-
Grady	2,519	3,022,800	1,254,462	627	530
Greene	28	33,600	13,944	7	6
Gwinnett	22	26,400	10,956	5	5
Habersham		-	-	-	-
Hall		-	-	-	-
Hancock	339	406,800	168,822	84	71
Haralson		-	-	-	-
Harris	74	88,800	36,852	18	16
Hart		-	-	-	-
Heard		-	-	-	-
Henry		-	-	-	-
Houston	1,196	1,435,200	595,608	298	252
Irwin	1,320	1,584,000	657,360	329	278
Jackson	6	7,200	2,988	1	1
Jasper		-	-	-	-
Jeff Davis	88	105,600	43,824	22	19
Jefferson	1,416	1,699,200	705,168	353	298
Jenkins	401	481,200	199,698	100	84
Johnson	123	147,600	61,254	31	26
Jones		-	-	-	-
Lamar	461	553,200	229,578	115	97
Lanier	1,335	1,602,000	664,830	332	281
Laurens	249	298,800	124,002	62	52
Lee	5,923	7,107,600	2,949,654	1,475	1,246
Liberty	31	37,200	15,438	8	7
Lincoln		-	-	-	-
Long		-	-	-	-
Lowndes	2,866	3,439,200	1,427,268	714	603
Lumpkin		-	-	-	-
Macon	3,677	4,412,400	1,831,146	916	774
Madison	10	12,000	4,980	2	2
Marion	74	88,800	36,852	18	16
McDuffie	249	298,800	124,002	62	52
McIntosh		-	-	-	-

Meriwether	104	124,800	51,792	26	22
Miller		-	-	-	-
Mitchell	7,968	9,561,600	3,968,064	1,984	1,677
Monroe		-	-	-	-
Montgomery	824	988,800	410,352	205	173
Morgan	361	433,200	179,778	90	76
Murray		-	-	-	-
Muscogee		-	-	-	-
Newton	20	24,000	9,960	5	4
Oconee	33	39,600	16,434	8	7
Oglethorpe	12	14,400	5,976	3	3
Paulding		-	-	-	-
Peach	6,321	7,585,200	3,147,858	1,574	1,330
Pickens	1,040	1,248,000	517,920	259	219
Pierce		-	-	-	-
Pike	197	236,400	98,106	49	41
Polk	833	999,600	414,834	207	175
Pulaski		-	-	-	-
Putnam	10	12,000	4,980	2	2
Quitman		-	-	-	-
Rabun		-	-	-	-
Randolph		-	-	-	-
Richmond	47	56,400	23,406	12	10
Rockdale		-	-	-	-
Schley	98	117,600	48,804	24	21
Screven		-	-	-	-
Seminole	169	202,800	84,162	42	36
Spalding	102	122,400	50,796	25	21
Stephens		-	-	-	-
Stewart	150	180,000	74,700	37	32
Sumter	2,964	3,556,800	1,476,072	738	624
Talbot	112	134,400	55,776	28	24
Taliaferro		-	-	-	-
Tattall	2,442	2,930,400	1,216,116	608	514
Taylor		-	-	-	-
Telfair	1,722	2,066,400	857,556	429	362
Terell	1,225	1,470,000	610,050	305	258
Thomas	3,393	4,071,600	1,689,714	845	714
Tift	969	1,162,800	482,562	241	204
Toombs	780	936,000	388,440	194	164
Towns		-	-	-	-
Treutlen	31	37,200	15,438	8	7
Troup	23	27,600	11,454	6	5
Turner	5,651	6,781,200	2,814,198	1,407	1,189
Twiggs	44	52,800	21,912	11	9
Union		-	-	-	-
Upson		-	-	-	-
Walker		-	-	-	-
Walton		-	-	-	-
Ware	1,019	1,222,800	507,462	254	214
Warren	202	242,400	100,596	50	43
Washington	3,696	4,435,200	1,840,608	920	778
Wayne	444	532,800	221,112	111	93

Webster	922	1,106,400	459,156	230	194
Wheeler	246	295,200	122,508	61	52
White	2	2,400	996	0	0
Whitfield	598	717,600	297,804	149	126
Wilcox		-	-	-	-
Wilkes		-	-	-	-
Wilkinson		-	-	-	-
Worth	1,090	1,308,000	542,820	271	229
Total	105,973	127,167,600	52,774,554	26,387	22,297

USDA 2002 Census of Agriculture and University of Florida, IFAS Extension

Table A-6. Papermill Sludge Production, 2002

Georgia Counties	Cities	Tons/day	Product (Total) production tons/day/county	Product category (NCASI)	mean dry lb per short ton shipped product	Dry tons/year/sludge
Bibb	Macon	Armstrong World Industries Inc.- moulded pulp egg cartons 100, Riverwood International Corp- coated unbleached kraft and mottled white linearboard 1600	1700	R - recycle container & box - nondeinked 53, unbleached container & box - unbleached kraft 47, A- construction 100%	53 of 88.1 and 47 of 56 and 20.4 of 100	5,960
Camden	St. Marys	Kraft-Durango-Georgia Paper Co.-specialty and converting papers 700, C1S bleached board 500	1200	bleached container & box (or plus market pulp) -bleached kraft 56.96%,unbleached container & box - unbleached kraft 27.93%,printing & writing bleached kraft 15.11%	81.2 of 56.96% and 56 of 27.93% and 138 of 15.11%	18,121
Chatham	Savannah	International Paper Co.- Kraft bag and wrapping,coated papers 3400	3400	unbleached container & box - unbleached kraft 100%	56	34,748
Cobb	Roswell, Marietta,Austell	headquarters and pulp mills				-
Dougherty	Albany	Procter & Gamble Paper Products Co.- sanitary tissue,household paper products	tel 229-883-2000	printing & writing - purchased	130	-

Early	Cedar Springs	Geogia-Pacific Corp- unbleached kraft linear board 2270,Semichemical corrugation medium 665	2935	unbleached container & box- unbleached kraft 100%	56	29,996
Effingham	Rincon	Geogia-Pacific Corp- call 912-826-5216		tissue & toweling - deinked 100%		-
Floyd	Rome	Inland Paper Board & Packaging, Inc.- Unbleached kraft linear board 2350	2350	unbleached container & box - unbleached kraft 100%	56	24,017
Glynn	Brunswick	Geogia-Pacific Corp.- bleached container board,linerboard,packaging board 400; bleached softwood kraft filter paper grade and fluff market pulp 1860 airdry tonnes.	2260	market pulp - bleached kraft or sulfite 100%	70.4	29,036
Laurens	Dublin	SP Newsprint Co.- recycled containerboard 1525	1525	newsprint - deinked 100%	524	145,836
Liberty	Riceboro	Interstate Paper L.L.C. - unbleached kraft linerboard,drum liners 760	760	unbleached container & box - unbleached kraft 100%	56	7,767
Lowndes	Valdosta	Packaging Corp of America- unbleached kraft linerboard 1250	1250	unbleached container & box - unbleached kraft 100%	56	12,775
Macon	Oglethorpe	just pulp mill				-
Polk	Cedartown	Smurfit-Stone Container Corp- tube stock 70.	70	recycle container & box - nondeinked 100%	88.1	1,125

Pulaski	Hawkinsville	Hollingsworth & Vose Co.- industrial and technical specialty papers 35	35	packaging & industrial - purchased 100%	178	1,137
Richmond	Augusta	<i>Augusta Newsprint Co.-</i> recycled content newsprint 1200 metric tons or 1181 tons; <i>Deerfield Specialty Papers Inc.-</i> Grease proof and glassine specialty papers 45; <i>International Paper Co.-</i> blister board, bleached paperboard and linerboard 1860	3105	newsprint - mechanical (or plus deinked) 100%, D - packaging & industrial -purchased 100%, I - market pulp- bleached kraft or sulfite 6%, bleached container & kraft (or plus market pulp)-bleached kraft 94%	N - 197 of 100%, D - 178 of 100%, I - 70.4 Of 6% and 81.2 of 94%	71,265
Rockdale	Conyers	Pratt Industries Inc. headquarters; Visy Paper Inc.- recycled container board 780	780	recycle container & box - nondeinked 100%	88.1	12,541
Wayne	Jesup	just pulp mill				
Wilkes	Washington	Paper-Pak Products, Inc.- Cellulose wadding 25	25	tissue and toweling - nondeinked 100%	194	885
Total						395,210

Table A-7. Black Liquor Production, Georgia, 2002

County	Company	Production tons/day			Estimated Black Liquor Solids (dry tons)/day	County Annual (dry tons/year)
		Pulp	Paper	Board		
Bibb	Armstrong	900			1,350	
	Pactiv Corp.			100		
	Graphics Packaging			1,600	2,400	1,350,000
Chatham	Smurfit Stone (board)/Weyerhaeuser (pulp)			950	1,425	
	IP			3,400	5,100	2,349,000
Cobb	Austell Boxboard			420	630	
	Sweetwater Paper		340		510	410,400
Decatur	G-P			2,935	4,403	1,584,900
Floyd	Temple-Inland			2,350	3,525	1,269,000
Glynn	G-P	1,860		400	3,390	1,220,400
Laurens	SP Newsprint		1,525		572	205,875
Liberty	Interstate			760	1,140	410,400
Lowndess	PCA			1,250	1,875	675,000
Macon	Weyerhaeuser	1,050			1,575	567,000
Richmond	Augusta Newsprint		1,200		450	
	Deerfield Specialty Papers		45			
	IP			1,860	2,790	1,166,400
Wayne	Rayonier	1,589			2,384	858,060
Total		5,399	3,110	16,025	33,518	12,066,435

Reference: Jim Frederick, Georgia Institute of Technology, Institute of Paper Science & Technology

*Calculated on a 360 day year

Table A-8. Georgia Combined Resource Chart (Residues GENERATED), Dry tons per year

Georgia Counties	Forestry		Forestry Primary Processing Residues			Urban Wood Waste \$12.50/(dry tons/year)	Pecan shells (dry tons/year)	Papermill Sludge (dry tons/year)	Black Liquor Production (dry tons/year)	County Totals (dry tons/year)
	Unmerchantable standing timber, 20 year Growth Cycle (dry tons/year)	Harvesting Residues (dry tons/year)	Mill residues - bark (dry tons/year)	Mill residues - coarse wood (dry tons/year)	Mill residues - fine wood (dry tons/year)					
APPLING	127,037	67,168	69,000	147,000	113,000	185	226	-		523,615
ATKINSON	83,427	27,762	0	0	0	81	41	-		111,311
BACON	69,855	38,389	0	0	0	115	45	-		108,403
BAKER	58,977	15,940	0	0	0	40	21	-		74,978
BALDWIN	56,975	26,131	0	0	0	467	16	-		83,588
BANKS	65,099	18,686	0	0	0	146	-	-		83,930
BARROW	31,153	3,262	0	0	0	464	-	-		34,879
BARTOW	91,285	33,269	0	0	0	826	-	-		125,380
BEN HILL	57,658	26,244	54,000	115,000	79,000	193	44	-		332,140
BERRIEN	91,520	26,583	0	0	0	183	357	-		118,643
BIBB	52,963	8,899	0	0	0	1,721	71	5,961	1,350,000	1,419,613
BLECKLEY	51,369	9,222	0	0	0	125	52	-		60,768
BRANTLEY	122,530	67,232	38,000	128,000	99,000	154	32	-		454,948
BROOKS	106,813	31,331	0	0	0	178	386	-		138,709
BRYAN	134,367	38,356	0	0	0	270	-	-		172,993
BULLOCH	117,425	55,766	44,000	128,000	117,000	562	211	-		462,964
BURKE	185,760	97,094	0	0	0	257	134	-		283,245
BUTTS	43,113	16,990	0	0	0	203	23	-		60,329
CALHOUN	43,826	21,916	0	0	0	55	508	-		66,304
CAMDEN	170,285	57,462	0	0	0	521	-	18,121		246,388
CANDLER	42,266	23,385	0	0	0	99	73	-		65,823
CARROLL	116,340	51,858	1,000	3,000	2,000	938	3	-		175,139
CATOOSA	25,951	6,492	0	0	0	577	2	-		33,023
CHARLTON	170,855	50,937	0	0	0	105	-	-		221,897
CHATHAM	65,874	43,379	149,000	2,000	2,000	2,498	-	34,748	2,349,000	2,648,499
CHATTAHOOCHEE	62,916	22,868	0	0	0	184	-	-		85,969
CHATTOOGA	85,853	18,718	0	0	0	253	-	-		104,824
CHEROKEE	120,506	34,771	0	0	0	1,568	-	-		156,845

CLARKE	16,974	1,292	0	0	0	1,003	-	-		19,269
CLAY	46,461	20,947	0	0	0	39	-	-		67,447
CLAYTON	15,988	7,994	0	0	0	2,366	-	-		26,348
CLINCH	278,871	101,987	25,000	53,000	23,000	74	5	-		481,937
COBB	33,541	2,842	0	0	0	6,459	-	-	410,400	453,243
COFFEE	120,988	38,695	0	0	0	387	102	-		160,173
COLQUITT	64,884	39,018	0	0	0	451	266	-		104,618
COLUMBIA	77,127	28,666	0	0	0	1,033	11	-		106,837
COOK	47,977	7,300	5,000	16,000	10,000	168	59	-		86,504
COWETA	108,857	46,512	0	0	0	990	3	-		156,361
CRAWFORD	82,584	37,177	0	0	0	115	635	-		120,512
CRISP	44,218	20,866	90,000	22,000	21,000	228	806	-		199,119
DADE	51,232	7,219	0	0	0	170	155	-		58,776
DAWSON	77,511	9,206	0	0	0	176	-	-		86,893
DECATUR	89,304	63,809	0	0	0	6,607	-	-	1,585,080	1,744,799
DEKALB	19,612	3,941	0	0	0	300	-	-		23,853
DODGE	115,050	67,136	25,000	14,000	11,000	201	-	-		232,387
DOOLY	75,486	36,515	0	0	0	115	536	-		112,653
DOUGHERTY	60,853	21,899	0	0	0	1,041	2,564	-		86,358
DOUGLAS	53,111	5,087	0	0	0	1,009	-	-		59,207
EARLY	65,124	34,642	157,000	0	0	134	105	29,996		287,000
ECHOLS	116,907	41,732	0	0	0	28	-	-		158,666
EFFINGHAM	133,916	59,497	26,000	90,000	68,000	425	-	-		377,837
ELBERT	93,343	33,285	0	0	0	214	10	-		126,853
EMANUEL	165,037	82,252	57,000	128,000	109,000	233	283	-		541,805
EVANS	45,694	21,383	0	0	0	112	143	-		67,331
FANNIN	131,602	14,793	1,000	3,000	3,000	210	-	-		153,605
FAYETTE	45,183	12,016	0	0	0	1,023	-	-		58,221
FLOYD	115,700	62,888	177,000	115,000	94,000	947	-	24,017	1,269,000	1,858,552
FORSYTH	34,093	12,371	0	0	0	1,070	-	-		47,534
FRANKLIN	45,647	6,492	0	0	0	214	1	-		52,354
FULTON	83,172	31,299	0	0	0	8,245	-	-		122,715
GILMER	168,720	10,578	5,000	16,000	8,000	219	-	-		208,517
GLASCOCK	35,299	18,992	0	0	0	28	4	-		54,324
GLYNN	84,427	45,172	0	0	0	752	-	29,037	1,220,400	1,379,788
GORDON	56,242	14,519	0	0	0	465	-	-		71,225

GRADY	77,744	37,323	11000	29000	25000	239	530	-		180,836
GREENE	103,421	40,730	0	0	0	156	6	-		144,313
GWINNETT	55,581	22,319	0	0	0	6,040	5	-		83,944
HABERSHAM	96,201	24,823	3,000	7,000	5,000	360	-	-		136,384
HALL	93,485	11,660	1,000	2,000	1,000	1,365	-	-		110,510
HANCOCK	132,807	78,715	0	0	0	100	71	-		211,694
HARALSON	70,649	21,883	0	0	0	278	-	-		92,810
HARRIS	134,784	44,800	0	0	0	251	16	-		179,850
HART	32,003	2,988	0	0	0	245	-	-		35,235
HEARD	75,310	41,360	0	0	0	116	-	-		116,786
HENRY	63,029	26,195	0	0	0	1,256	-	-		90,480
HOUSTON	84,283	26,470	0	0	0	1,192	252	-		112,196
IRWIN	59,254	18,621	0	0	0	102	278	-		78,255
JACKSON	78,139	13,711	0	0	0	432	1	-		92,284
JASPER	115,807	27,988	65,000	222,000	172,000	117	-	-		602,913
JEFF DAVIS	69,600	127,246	32,000	71,000	68,000	141	19	-		368,005
JEFFERSON	111,505	90,989	29,000	78,000	55,000	198	298	-		364,989
JENKINS	67,655	53,166	0	0	0	93	84	-		120,999
JOHNSON	66,671	54,345	0	0	0	92	26	-		121,133
JONES	114,449	29,377	0	0	0	258	-	-		144,084
LAMAR	39,095	11,450	0	0	0	166	97	-		50,808
LANIER	53,083	14,164	0	0	0	77	281	-		67,605
LAURENS	173,731	63,776	20,000	69,000	54,000	486	52	145,836	205,920	732,802
LEE	48,514	31,945	0	0	0	258	1,246	-		81,963
LIBERTY	112,761	54,006	151000	7000	6000	661	7	7,767	410,400	749,601
LINCOLN	53,625	22,465	0	0	0	92	-	-		76,182
LONG	172,211	69,364	0	0	0	96	-	-		241,672
LOWNDES	96,916	34,739	160,000	95,000	85,000	945	603	12,775	675,000	1,160,978
LUMPKIN	116,577	7,946	2000	4,000	4,000	219	-	-		134,741
MCDUFFIE	68,608	26,389	89000	59000	56000	145	774	-		299,916
MCINTOSH	80,938	31,929	131000	23000	30000	279	2	-		297,148
MACON	83,238	44,219	0	0	0	75	16	-	567,000	694,547
MADISON	57,837	17,103	0	0	0	241	52	-		75,234
MARION	75,897	36,903	0	0	0	112	-	-		112,911
MERIWETHER	127,119	39,261	49,000	131,000	127,000	255	22	-		473,656
MILLER	45,675	6,202	0	0	0	70	-	-		51,947

MITCHELL	45,510	45,236	0	0	0	235	1,677	-		92,657
MONROE	86,223	52,197	84,000	30,000	21,000	222	-	-		273,642
MONTGOMERY	47,399	33,640	0	0	0	87	173	-		81,299
MORGAN	91,056	32,607	0	0	0	171	76	-		123,909
MURRAY	105,390	28,230	0	0	0	375	-	-		133,995
MUSCOGEE	43,700	22,319	0	0	0	2,015	-	-		68,035
NEWTON	51,906	14,164	0	0	0	671	4	-		66,744
OCONEE	33,949	10,336	0	0	0	271	7	-		44,563
OGLETHORPE	129,895	50,081	0	0	0	128	3	-		180,106
PAULDING	90,934	37,097	0	0	0	881	-	-		128,912
PEACH	11,642	4,215	0	0	0	277	1,330	-		17,464
PICKENS	81,857	17,264	0	0	0	233	219	-		99,573
PIERCE	82,784	34,109	148,000	100,000	62,000	175	-	-		427,067
PIKE	52,074	11,919	0	0	0	145	41	-		64,180
POLK	64,477	26,325	0	0	0	405	175	1,126		92,508
PULASKI	34,315	22,852	0	0	0	93	-	1,137		58,396
PUTNAM	87,448	30,007	28,000	86,000	65,000	201	2	-		296,658
QUITMAN	53,054	15,020	0	0	0	27	-	-		68,101
RABUN	161,697	3,715	0	0	0	152	-	-		165,563
RANDOLPH	93,821	51,971	0	0	0	89	-	-		145,880
RICHMOND	54,880	28,036	139,000	106,000	97,000	2,107	10	71,265	1,166,400	1,664,698
ROCKDALE	19,455	2,261	0	0	0	763	-	12,541		35,020
SCHLEY	39,929	24,790	0	0	0	44	21	-		64,783
SCREVEN	170,013	86,887	2000	5000	3000	160	-	-		267,060
SEMINOLE	18,495	13,598	0	0	0	109	36	-		32,237
SPALDING	37,535	4,748	0	0	0	640	21	-		42,945
STEPHENS	39,607	13,114	0	0	0	280	-	-		53,001
STEWART	129,360	75,307	0	0	0	59	32	-		204,758
SUMTER	87,936	57,542	0	0	0	347	624	-		146,449
TALBOT	133,183	37,032	0	0	0	77	24	-		170,315
TALIAFERRO	59,245	28,182	0	0	0	21	-	-		87,448
TATTNALL	76,910	29,328	0	0	0	212	514	-		106,964
TAYLOR	94,225	48,547	0	0	0	92	-	-		142,863
TELFAIR	101,974	61,305	0	0	0	126	362	-		163,768
TERRELL	58,271	36,790	0	0	0	124	258	-		95,443
THOMAS	81,356	51,212	61,000	139,000	104,000	475	714	-		437,757

TIFT	36,898	13,130	0	0	0	409	204	-		50,641
TOOMBS	56,986	48,014	31,000	13,000	3,000	288	164	-		152,452
TOWNS	56,161	840	0	0	0	97	-	-		57,098
TREUTLEN	39,293	29,619	0	0	0	66	7	-		68,984
TROUP	124,092	40,698	0	0	0	651	5	-		165,446
TURNER	31,938	14,244	0	0	0	102	1,189	-		47,474
TWIGGS	125,876	31,848	0	0	0	113	9	-		157,846
UNION	96,169	4,910	0	0	0	191	-	-		101,269
UPSON	88,542	19,913	37000	125000	99000	300	-	-		369,755
WALKER	120,437	18,653	0	0	0	697	-	-		139,787
WALTON	59,734	9,270	0	0	0	648	-	-		69,651
WARE	199,907	61,160	0	0	0	390	214	-		261,672
WARREN	77,230	59,271	28,000	90,000	70,000	67	43	-		324,610
WASHINGTON	156,501	105,653	0	0	0	224	778	-		263,155
WAYNE	145,771	78,457	0	0	0	283	93	-	858,240	1,082,844
WEBSTER	47,224	37,646	27,000	68,000	65,000	24	194	-		245,088
WHEELER	88,667	43,653	0	0	0	54	52	-		132,426
WHITE	88,390	10,514	6,000	19,000	14,000	201	0	-		138,106
WHITFIELD	47,102	23,401	6,000	15,000	13,000	921	126	-		105,550
WILCOX	94,764	38,033	0	0	0	82	-	-		132,880
WILKES	117,542	81,881	7,000	21,000	17,000	117	-	885		245,424
WILKINSON	141,726	52,665	9,000	24,000	16,000	121	-	-		243,512
WORTH	106,790	32,139	0	0	0	249	229	-		139,407
Total	13,260,175	5,314,287	2,279,000	2,618,000	2,096,000	86,209	22,297	395,210	12,066,840	38,138,019

APPENDIX II

**SOURCES OF INFORMATION AND METHODS OF CALCULATING INFORMATION IN
TABLES A-1—A-8**

APPENDIX II

Sources of Information and Methods of Calculating Information in Tables A-1—A-8

The following methodologies are presented in order of the appearance of the columns in the spreadsheets.

Forest Resources: Unused merchantable and Unmerchantable Standing Timber

Base information for this calculation was obtained from the U.S. Forest Service, Forest Inventory and Analysis Mapmaker Program 2003 data [1]*. This website gave all live biomass per county, and all live merchantable biomass, with all values in dry tons. To calculate the amount of unmerchantable standing timber, the amount of all merchantable standing timber was subtracted from the amount of total biomass.

- Unmerchantable standing timber = all live biomass - all live merchantable standing timber

To calculate the amount of timber available annually, a 30-year growth cycle was assumed. This method was used by ORNL in its study entitled *Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion Ton Annual Supply, April 2005* [2]. Since the 30-year grow cycle is an average national number, and the grow cycle is actually shorter in Georgia due to the state’s climatic conditions and good soils, the use of the 30-year growth cycle for Georgia was considered conservative. Therefore GBI has also included a calculation using a 20 year growth cycle, which we felt was closer to Georgia’s grow cycle. The numbers obtained using a growth cycle of 20 years are much closer to those calculated using an alternative method based on harvesting rates for merchantable wood. This method is described below and the results shown in Appendix III.

Y	Unmerchantable Standing Timber (dry tons)	X	$\frac{\text{Unmerchantable Standing Timber (dry tons)}}{\text{Growth Cycle (years)}}$	=	Z	Unmerchantable Standing Timber (dry tons)
			30 (years)			year

Y	Unmerchantable Standing Timber (dry tons)	X	$\frac{\text{Unmerchantable Standing Timber (dry tons)}}{\text{Growth Cycle (years)}}$	=	Z	Unmerchantable Standing Timber (dry tons)
			20 (years)			year

Alternative method for calculating availability of unmerchantable standing timber

Table A3-1 and A3-2 in Appendix III show the results of calculating the amount of unmerchantable wood using an alternative method, which also shows that forestry calculations are not an exact science. For the alternative method, the amount of merchantable standing timber was obtained from the US Forest Service, Forest Inventory and Analysis Mapmaker Program 2003 data [1]. This data was provided in dry tons. Annual removals of growing stock in (cuft) were obtained from the USDA Forest Service, Forest Inventory and Analysis, Southern Research Station, 2003. A conversion factor of 75 lbs/cuft for

* References for the Appendix are listed at the end of the Appendix, and are separate from the main body References.

softwood and 78 lbs/cuft of hardwood was obtained from Tony Johnson at the US Forest Service [3] to convert cuft to dry tons. He also suggested that we assume a moisture content of 50% for standing timber.

After converting the removals of growing stock from cubic feet to dry tons, the amount of removals of growing stock was divided by the amount of merchantable standing timber. This provided a percentage rate for the amount of merchantable currently being harvested annually in each county. GBI then calculated the unmerchantable standing timber by taking all live biomass – all live merchantable = unmerchantable standing timber. It was then assumed that the unmerchantable harvesting rate would be similar as to the merchantable standing timber. Therefore, unmerchantable standing timber was multiplied by the harvest rate to get the amount in dry tons available on an annual basis.

$$\frac{Y \text{ Removals of Growing Stock (dry tons)}}{\text{Merchantable Standing Timber (dry tons)}} \times \frac{\% \text{ currently being harvested}}{\text{year}} = Z$$

$$\frac{Y \text{ Unmerchantable Standing Timber (dry tons)}}{\text{year}} \times \frac{\% \text{ currently being harvested}}{\text{year}} = Z \text{ Unmerchantable Timber Available Rate (dry tons)}$$

Forest Residues: Harvesting Residues and Primary Processing Residues

Base information for harvesting residues was obtained from the U.S. Forest Service, Southern Research Station, Timber Product Output Reports from the website which is based on field data collected in 2003 [1].

Data from the website listed harvesting residues in MCF (1,000 cubic feet). To convert to dry tons, the average density of several species of wood (Oak: red, black, live, white and Pine: red, white, and southern) was calculated to be 36.71 lb/cf based on information from *The Standard Handbook for Mechanical Engineers*, Baumeister & Marks, seventh edition, pages 6-7 and 6-8 [5]. This information was given for “air-dry” conditions, and based on personal experience was assumed to be 12% moisture content. The “dry density” was then obtained by multiplying by 0.88 to get 32.30 lb/cf.

$$\frac{Z \text{ MCF}}{\text{yr}} \times \frac{1000 \text{ cf}}{1 \text{ MCF}} \times \frac{32.30 \text{ lb}}{\text{cf}} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = \frac{Y \text{ ton}}{\text{yr}}$$

The percent hardwood and softwood for the state of Georgia was obtained from the US Forest Timber Product Output program. Volume of logging residue was charted into major species groups then divided by the total product produced (Table 2). Hardwood/Softwood percentages averaged 50% for both hard and soft woods. Therefore a standard average instead of a weighted average was obtained using the wood densities.

Mill Residues

The data provided on mill residues was from USDA Forest Service, Timber Product Output (TPO) Reports, Forest Inventory and Analysis, Southern Research Station [4]. Mill residue data is from the last sampling year of 2003. All data was provided in thousand dry tons per year on a county level basis for bark, coarse wood residues, and fine wood residues. The 1% percent unutilized mill residue was provided by the US Forest Service, Forest Inventory and Analysis Mapmaker Program, Version 2.1 [1].

Urban Wood Waste

Data for urban wood waste (in the form of an urban wood waste supply curve) for all counties was obtained from the Oak Ridge National Laboratory [6].

Pecan shells

Pecan bearing acres were obtained from the USDA 2002 Census of Agriculture [7] on a county level basis.

A yield of 1200 lbs of pecans per acre was provided by Dr. Wojciech Florkowski, Department of Agricultural and Applied Economics at the University of Georgia, Griffin Campus [8].

The average ratio of shell to total nut weight was determined to be 41.5% (*kernel yield* of 1,485.2 lb/acre and "*in shell yield*" of 2,539.7 lb/acre = 58.5% kernel) [9]. The average moisture content of pecan shells varies from 11.3% for dry shelled pecans to 15-16% for "rewet" pecans [10]. For this analysis a weighted average moisture content of 15.5% was used.

Due to shipping costs, 85% of all pecans are sold shelled. An estimated 90+% of all pecans harvested in the Southeast are soaked (rewet) in water before shelling. Soaking mitigates meat shatter. Pecans are shelled from mid-October through January in all Southeast states. It was assumed that all shelled pecans were shelled in the county that they were produced.

$$\frac{\text{Z acres}}{\text{yr}} \times \frac{1200 \text{ lb nuts}}{1 \text{ acre}} \times \frac{0.415 \text{ lb shell}}{1 \text{ lb nut}} \times \frac{1 \text{ ton}}{2000 \text{ lb}} \times \frac{0.845 \text{ ton dry shell}}{1 \text{ ton shell}} = \frac{\text{Y dry ton shell}}{\text{yr}}$$

Paper mill Sludge

The location of each paper mill, along with its product line and tonnage of product produced were obtained from the *2002 Lockwood – Post's Directory of the Pulp, Paper, and Allied Trades* [11]. Information on the dry pounds of sludge produced per ton of each type of paper product produced was obtained from the National Council for Air and Stream Improvement, Inc [12].

Since factors were available to directly estimate sludge production in dry tons based on the type and amount of product output, information on sludge moisture content was not needed. Actual factors for each type of paper plant were used for this study; however, on average about 87 dry pounds of sludge is generated per ton of product produced.

$$\frac{\text{Z tons of product}}{\text{day}} \times \frac{\% \text{ of each product}}{\text{product}} \times \frac{\text{W mean dry lb sludge}}{\text{dry ton product}} \times \frac{1 \text{ ton}}{2000 \text{ lb}} \times \frac{365 \text{ day}}{\text{yr}} = \frac{\text{y dry ton}}{\text{yr}}$$

Black Liquor

Black Liquor production was provided on a dry tons/day output based on paper, board and pulp production of the plant. Data in dry tons per day of Black Liquor production per plant was provided by the Georgia Institute of Technology through the Paper Science & Technology Division [13].

$$\frac{\text{Black Liquor (dry Z tons)}}{\text{day}} \times \frac{360 \text{ days}}{1 \text{ yr}} = \frac{\text{Y dry tons}}{\text{yr}}$$

REFERENCES: APPENDIX II

1. US Forest Service, www.fia.fs.fed.us/tools-data/tools/
2. *Biomass as a Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply*, DOE and USDA, April 2005.
3. Johnson, Tony G. Resource Use, Section Head, SRS, Forestry Inventory and Analysis, Knoxville, Tennessee, personal communication 2005.
4. US Forest Service, Southern Research Station, srsfia1.fia.srs.fs.fed.us/php/tpo2/tpo.php.
5. Baumeister, Theodore and Lionel S. Marks, editors, 1967, *Standard Handbook for Mechanical Engineers*, seventh edition, pp. 6-7 and 6-8
6. Walsh, Marie, 2002, ORNL Biomass Feedstock Development Program, Oak Ridge, Tennessee, personal communication.
7. United States Department of Agriculture, National Agricultural Statistics Service, 2002 Census of Agriculture.
www.nass.usda.gov/census/census02/volume1/ga/st13_2_031_031.pdf
8. Florkowski, Wojciech, 2005, The University of Georgia, Department of Agriculture and Applied Economics, Griffin Campus, personal communication, June.
9. Clark, L.J. and E.W. Carpenter, 1999, Pecan Variety Study on the Safford Agricultural Center.
ag.Arizona.edu/pubs/crops/az1178/az1178-13.pdf
10. Sumner, Paul E., 2002, University of Georgia, Extension Engineer, Biological and Agricultural Engineering Extension Unit, Tifton, Georgia, personal communication
11. *2002 Lockwood-Post's Directory of the Pulp, Paper, and Allied Trades*, 2001, Paperloop Publications, San Francisco, California, pp. 37-145
12. NCASI (National Council for Air and Stream Improvement, Inc.), 1999, Central-Lake States Regional Center, Western Michigan University, Kalamazoo, Michigan, from their paper entitled "Solid Waste Management Practices in the US Paper Industry-1995," Technical Bulletin No. 793, September, Appendix B, Table B1
13. Fredrick, Jim, Director of IPST, 2005, Georgia Institute of Technology, Institute of Paper Science & Technology, personal communication, June

APPENDIX III

Results Of An Alternative Method For Calculating Availability Of Unmerchantable Standing Timber

Table A3-1. Removals of Growing Stock

State	Species Group	Removals of Growing Stock		Weight Conversion	Moisture Content	Removals of Growing Stock	
		<i>Thousand cubic feet</i>	<i>cubic feet</i>	<i>lbs/cuft</i>	<i>mc</i>	<i>dry tons/yr</i>	<i>dry tons/yr/county</i>
Appling, GA	Softwood	15,631	15,631,000	75	0.5	293,081	341,519
	Hardwood	2,484	2,484,000	78	0.5	48,438	
Atkinson, GA	Softwood	7,072	7,072,000	75	0.5	132,600	146,660
	Hardwood	721	721,000	78	0.5	14,060	
Bacon, GA	Softwood	7,798	7,798,000	75	0.5	146,213	185,349
	Hardwood	2,007	2,007,000	78	0.5	39,137	
Baker, GA	Softwood	2,187	2,187,000	75	0.5	41,006	67,624
	Hardwood	1,365	1,365,000	78	0.5	26,618	
Baldwin, GA	Softwood	4,728	4,728,000	75	0.5	88,650	121,449
	Hardwood	1,682	1,682,000	78	0.5	32,799	
Banks, GA	Softwood	3,139	3,139,000	75	0.5	58,856	84,499
	Hardwood	1,315	1,315,000	78	0.5	25,643	
Barrow, GA	Softwood	514	514,000	75	0.5	9,638	14,435
	Hardwood	246	246,000	78	0.5	4,797	
Bartow, GA	Softwood	7,196	7,196,000	75	0.5	134,925	164,214
	Hardwood	1,502	1,502,000	78	0.5	29,289	
Ben Hill, GA	Softwood	4,412	4,412,000	75	0.5	82,725	118,371
	Hardwood	1,828	1,828,000	78	0.5	35,646	
Berrien, GA	Softwood	6,496	6,496,000	75	0.5	121,800	138,005
	Hardwood	831	831,000	78	0.5	16,205	
Bibb, GA	Softwood	1,998	1,998,000	75	0.5	37,463	44,541
	Hardwood	363	363,000	78	0.5	7,079	
Bleckley, GA	Softwood	1,616	1,616,000	75	0.5	30,300	42,488
	Hardwood	625	625,000	78	0.5	12,188	
Brantley, GA	Softwood	18,329	18,329,000	75	0.5	343,669	365,197
	Hardwood	1,104	1,104,000	78	0.5	21,528	
Brooks, GA	Softwood	7,407	7,407,000	75	0.5	138,881	160,546
	Hardwood	1,111	1,111,000	78	0.5	21,665	
Bryan, GA	Softwood	7,944	7,944,000	75	0.5	148,950	186,390
	Hardwood	1,920	1,920,000	78	0.5	37,440	
Bulloch, GA	Softwood	11,987	11,987,000	75	0.5	224,756	275,222
	Hardwood	2,588	2,588,000	78	0.5	50,466	
Burke, GA	Softwood	13,454	13,454,000	75	0.5	252,263	413,937
	Hardwood	8,291	8,291,000	78	0.5	161,675	
Butts, GA	Softwood	2,456	2,456,000	75	0.5	46,050	73,857
	Hardwood	1,426	1,426,000	78	0.5	27,807	
Calhoun, GA	Softwood	3,396	3,396,000	75	0.5	63,675	96,806
	Hardwood	1,699	1,699,000	78	0.5	33,131	
Camden, GA	Softwood	16,564	16,564,000	75	0.5	310,575	319,838
	Hardwood	475	475,000	78	0.5	9,263	
Candler, GA	Softwood	5,443	5,443,000	75	0.5	102,056	118,807
	Hardwood	859	859,000	78	0.5	16,751	
Carroll, GA	Softwood	12,273	12,273,000	75	0.5	230,119	265,862
	Hardwood	1,833	1,833,000	78	0.5	35,744	
Catoosa, GA	Softwood	285	285,000	75	0.5	5,344	22,601
	Hardwood	885	885,000	78	0.5	17,258	

Charlton, GA	Softwood	15,464	15,464,000	75	0.5	289,950	290,204
	Hardwood	13	13,000	78	0.5	254	
Chatham, GA	Softwood	8,408	8,408,000	75	0.5	157,650	205,542
	Hardwood	2,456	2,456,000	78	0.5	47,892	
Chattahoochee, GA	Softwood	3,472	3,472,000	75	0.5	65,100	100,259
	Hardwood	1,803	1,803,000	78	0.5	35,159	
Chattooga, GA	Softwood	4,378	4,378,000	75	0.5	82,088	95,348
	Hardwood	680	680,000	78	0.5	13,260	
Cherokee, GA	Softwood	8,822	8,822,000	75	0.5	165,413	183,060
	Hardwood	905	905,000	78	0.5	17,648	
Clarke, GA	Softwood	331	331,000	75	0.5	6,206	6,811
	Hardwood	31	31,000	78	0.5	605	
Clay, GA	Softwood	4,564	4,564,000	75	0.5	85,575	103,652
	Hardwood	927	927,000	78	0.5	18,077	
Clayton, GA	Softwood	726	726,000	75	0.5	13,613	31,085
	Hardwood	896	896,000	78	0.5	17,472	
Clinch, GA	Softwood	26,925	26,925,000	75	0.5	504,844	545,852
	Hardwood	2,103	2,103,000	78	0.5	41,009	
Cobb, GA	Softwood	422	422,000	75	0.5	7,913	12,359
	Hardwood	228	228,000	78	0.5	4,446	
Coffee, GA	Softwood	8,752	8,752,000	75	0.5	164,100	198,108
	Hardwood	1,744	1,744,000	78	0.5	34,008	
Colquitt, GA	Softwood	11,044	11,044,000	75	0.5	207,075	215,187
	Hardwood	416	416,000	78	0.5	8,112	
Columbia, GA	Softwood	4,636	4,636,000	75	0.5	86,925	127,797
	Hardwood	2,096	2,096,000	78	0.5	40,872	
Cook, GA	Softwood	1,972	1,972,000	75	0.5	36,975	39,491
	Hardwood	129	129,000	78	0.5	2,516	
Coweta, GA	Softwood	10,987	10,987,000	75	0.5	206,006	238,181
	Hardwood	1,650	1,650,000	78	0.5	32,175	
Crawford, GA	Softwood	5,261	5,261,000	75	0.5	98,644	159,172
	Hardwood	3,104	3,104,000	78	0.5	60,528	
Crisp, GA	Softwood	3,004	3,004,000	75	0.5	56,325	89,787
	Hardwood	1,716	1,716,000	78	0.5	33,462	
Dade, GA	Softwood	840	840,000	75	0.5	15,750	29,244
	Hardwood	692	692,000	78	0.5	13,494	
Dawson, GA	Softwood	2,083	2,083,000	75	0.5	39,056	46,388
	Hardwood	376	376,000	78	0.5	7,332	
Decatur, GA	Softwood	12,572	12,572,000	75	0.5	235,725	304,170
	Hardwood	3,510	3,510,000	78	0.5	68,445	
DeKalb, GA	Softwood	423	423,000	75	0.5	7,931	16,024
	Hardwood	415	415,000	78	0.5	8,093	
Dodge, GA	Softwood	10,784	10,784,000	75	0.5	202,200	299,018
	Hardwood	4,965	4,965,000	78	0.5	96,818	
Dooly, GA	Softwood	9,107	9,107,000	75	0.5	170,756	190,841
	Hardwood	1,030	1,030,000	78	0.5	20,085	
Dougherty, GA	Softwood	2,662	2,662,000	75	0.5	49,913	90,336
	Hardwood	2,073	2,073,000	78	0.5	40,424	
Douglas, GA	Softwood	884	884,000	75	0.5	16,575	23,303
	Hardwood	345	345,000	78	0.5	6,728	
Early, GA	Softwood	6,861	6,861,000	75	0.5	128,644	165,538
	Hardwood	1,892	1,892,000	78	0.5	36,894	
Echols, GA	Softwood	11,438	11,438,000	75	0.5	214,463	226,904

	Hardwood	638	638,000	78	0.5	12,441	
Effingham, GA	Softwood	12,235	12,235,000	75	0.5	229,406	286,346
	Hardwood	2,920	2,920,000	78	0.5	56,940	
Elbert, GA	Softwood	3,741	3,741,000	75	0.5	70,144	135,098
	Hardwood	3,331	3,331,000	78	0.5	64,955	
Emanuel, GA	Softwood	15,405	15,405,000	75	0.5	288,844	386,285
	Hardwood	4,997	4,997,000	78	0.5	97,442	
Evans, GA	Softwood	4,102	4,102,000	75	0.5	76,913	100,937
	Hardwood	1,232	1,232,000	78	0.5	24,024	
Fannin, GA	Softwood	1,253	1,253,000	75	0.5	23,494	56,780
	Hardwood	1,707	1,707,000	78	0.5	33,287	
Fayette, GA	Softwood	1,463	1,463,000	75	0.5	27,431	49,837
	Hardwood	1,149	1,149,000	78	0.5	22,406	
Floyd, GA	Softwood	15,638	15,638,000	75	0.5	293,213	328,313
	Hardwood	1,800	1,800,000	78	0.5	35,100	
Forsyth, GA	Softwood	1,998	1,998,000	75	0.5	37,463	55,305
	Hardwood	915	915,000	78	0.5	17,843	
Franklin, GA	Softwood	1,649	1,649,000	75	0.5	30,919	34,136
	Hardwood	165	165,000	78	0.5	3,218	
Fulton, GA	Softwood	6,998	6,998,000	75	0.5	131,213	157,070
	Hardwood	1,326	1,326,000	78	0.5	25,857	
Gilmer, GA	Softwood	1,938	1,938,000	75	0.5	36,338	49,364
	Hardwood	668	668,000	78	0.5	13,026	
Glascocock, GA	Softwood	2,722	2,722,000	75	0.5	51,038	81,906
	Hardwood	1,583	1,583,000	78	0.5	30,869	
Glynn, GA	Softwood	13,320	13,320,000	75	0.5	249,750	254,021
	Hardwood	219	219,000	78	0.5	4,271	
Gordon, GA	Softwood	2,482	2,482,000	75	0.5	46,538	66,018
	Hardwood	999	999,000	78	0.5	19,481	
Grady, GA	Softwood	7,209	7,209,000	75	0.5	135,169	176,645
	Hardwood	2,127	2,127,000	78	0.5	41,477	
Greene, GA	Softwood	9,393	9,393,000	75	0.5	176,119	206,246
	Hardwood	1,545	1,545,000	78	0.5	30,128	
Gwinnett, GA	Softwood	3,860	3,860,000	75	0.5	72,375	102,386
	Hardwood	1,539	1,539,000	78	0.5	30,011	
Habersham, GA	Softwood	3,523	3,523,000	75	0.5	66,056	107,572
	Hardwood	2,129	2,129,000	78	0.5	41,516	
Hall, GA	Softwood	2,844	2,844,000	75	0.5	53,325	60,248
	Hardwood	355	355,000	78	0.5	6,923	
Hancock, GA	Softwood	12,423	12,423,000	75	0.5	232,931	349,561
	Hardwood	5,981	5,981,000	78	0.5	116,630	
Haralson, GA	Softwood	5,344	5,344,000	75	0.5	100,200	113,558
	Hardwood	685	685,000	78	0.5	13,358	
Harris, GA	Softwood	9,470	9,470,000	75	0.5	177,563	219,390
	Hardwood	2,145	2,145,000	78	0.5	41,828	
Hart, GA	Softwood	489	489,000	75	0.5	9,169	13,439
	Hardwood	219	219,000	78	0.5	4,271	
Heard, GA	Softwood	11,324	11,324,000	75	0.5	212,325	225,176
	Hardwood	659	659,000	78	0.5	12,851	
Henry, GA	Softwood	4,708	4,708,000	75	0.5	88,275	121,601
	Hardwood	1,709	1,709,000	78	0.5	33,326	
Houston, GA	Softwood	6,144	6,144,000	75	0.5	115,200	134,564
	Hardwood	993	993,000	78	0.5	19,364	

Irwin, GA	Softwood	4,757	4,757,000	75	0.5	89,194	98,281
	Hardwood	466	466,000	78	0.5	9,087	
Jackson, GA	Softwood	3,617	3,617,000	75	0.5	67,819	73,259
	Hardwood	279	279,000	78	0.5	5,441	
Jasper, GA	Softwood	5,713	5,713,000	75	0.5	107,119	135,764
	Hardwood	1,469	1,469,000	78	0.5	28,646	
Jeff Davis, GA	Softwood	11,225	11,225,000	75	0.5	210,469	485,692
	Hardwood	14,114	14,114,000	78	0.5	275,223	
Jefferson, GA	Softwood	11,117	11,117,000	75	0.5	208,444	376,456
	Hardwood	8,616	8,616,000	78	0.5	168,012	
Jenkins, GA	Softwood	10,646	10,646,000	75	0.5	199,613	255,227
	Hardwood	2,852	2,852,000	78	0.5	55,614	
Johnson, GA	Softwood	7,552	7,552,000	75	0.5	141,600	233,075
	Hardwood	4,691	4,691,000	78	0.5	91,475	
Jones, GA	Softwood	5,963	5,963,000	75	0.5	111,806	142,382
	Hardwood	1,568	1,568,000	78	0.5	30,576	
Lamar, GA	Softwood	1,775	1,775,000	75	0.5	33,281	50,656
	Hardwood	891	891,000	78	0.5	17,375	
Lanier, GA	Softwood	4,303	4,303,000	75	0.5	80,681	80,740
	Hardwood	3	3,000	78	0.5	59	
Laurens, GA	Softwood	10,864	10,864,000	75	0.5	203,700	290,261
	Hardwood	4,439	4,439,000	78	0.5	86,561	
Lee, GA	Softwood	4,646	4,646,000	75	0.5	87,113	137,891
	Hardwood	2,604	2,604,000	78	0.5	50,778	
Liberty, GA	Softwood	10,640	10,640,000	75	0.5	199,500	257,649
	Hardwood	2,982	2,982,000	78	0.5	58,149	
Lincoln, GA	Softwood	5,026	5,026,000	75	0.5	94,238	112,431
	Hardwood	933	933,000	78	0.5	18,194	
Long, GA	Softwood	13,386	13,386,000	75	0.5	250,988	328,871
	Hardwood	3,994	3,994,000	78	0.5	77,883	
Lowndes, GA	Softwood	8,493	8,493,000	75	0.5	159,244	180,050
	Hardwood	1,067	1,067,000	78	0.5	20,807	
Lumpkin, GA	Softwood	1,385	1,385,000	75	0.5	25,969	36,538
	Hardwood	542	542,000	78	0.5	10,569	
McDuffie, GA	Softwood	5,546	5,546,000	75	0.5	103,988	129,104
	Hardwood	1,288	1,288,000	78	0.5	25,116	
McIntosh, GA	Softwood	6,475	6,475,000	75	0.5	121,406	153,854
	Hardwood	1,664	1,664,000	78	0.5	32,448	
Macon, GA	Softwood	7,086	7,086,000	75	0.5	132,863	196,491
	Hardwood	3,263	3,263,000	78	0.5	63,629	
Madison, GA	Softwood	4,836	4,836,000	75	0.5	90,675	94,049
	Hardwood	173	173,000	78	0.5	3,374	
Marion, GA	Softwood	8,620	8,620,000	75	0.5	161,625	187,892
	Hardwood	1,347	1,347,000	78	0.5	26,267	
Meriwether, GA	Softwood	7,886	7,886,000	75	0.5	147,863	189,632
	Hardwood	2,142	2,142,000	78	0.5	41,769	
Miller, GA	Softwood	1,169	1,169,000	75	0.5	21,919	29,114
	Hardwood	369	369,000	78	0.5	7,196	
Mitchell, GA	Softwood	8,581	8,581,000	75	0.5	160,894	212,335
	Hardwood	2,638	2,638,000	78	0.5	51,441	
Monroe, GA	Softwood	9,571	9,571,000	75	0.5	179,456	243,572
	Hardwood	3,288	3,288,000	78	0.5	64,116	
Montgomery, GA	Softwood	5,743	5,743,000	75	0.5	107,681	153,136

	Hardwood	2,331	2,331,000	78	0.5	45,455	
Morgan, GA	Softwood	7,903	7,903,000	75	0.5	148,181	168,676
	Hardwood	1,051	1,051,000	78	0.5	20,495	
Murray, GA	Softwood	3,788	3,788,000	75	0.5	71,025	119,249
	Hardwood	2,473	2,473,000	78	0.5	48,224	
Muscogee, GA	Softwood	4,501	4,501,000	75	0.5	84,394	107,911
	Hardwood	1,206	1,206,000	78	0.5	23,517	
Newton, GA	Softwood	2,953	2,953,000	75	0.5	55,369	69,292
	Hardwood	714	714,000	78	0.5	13,923	
Oconee, GA	Softwood	2,638	2,638,000	75	0.5	49,463	54,357
	Hardwood	251	251,000	78	0.5	4,895	
Oglethorpe, GA	Softwood	10,454	10,454,000	75	0.5	196,013	244,178
	Hardwood	2,470	2,470,000	78	0.5	48,165	
Paulding, GA	Softwood	7,146	7,146,000	75	0.5	133,988	176,244
	Hardwood	2,167	2,167,000	78	0.5	42,257	
Peach, GA	Softwood	1,283	1,283,000	75	0.5	24,056	24,056
Pickens, GA	Softwood	4,575	4,575,000	75	0.5	85,781	92,567
	Hardwood	348	348,000	78	0.5	6,786	
Pierce, GA	Softwood	7,478	7,478,000	75	0.5	140,213	169,560
	Hardwood	1,505	1,505,000	78	0.5	29,348	
Pike, GA	Softwood	1,967	1,967,000	75	0.5	36,881	53,963
	Hardwood	876	876,000	78	0.5	17,082	
Polk, GA	Softwood	6,650	6,650,000	75	0.5	124,688	138,318
	Hardwood	699	699,000	78	0.5	13,631	
Pulaski, GA	Softwood	4,201	4,201,000	75	0.5	78,769	106,615
	Hardwood	1,428	1,428,000	78	0.5	27,846	
Putnam, GA	Softwood	6,937	6,937,000	75	0.5	130,069	153,430
	Hardwood	1,198	1,198,000	78	0.5	23,361	
Quitman, GA	Softwood	3,208	3,208,000	75	0.5	60,150	73,781
	Hardwood	699	699,000	78	0.5	13,631	
Rabun, GA	Softwood	559	559,000	75	0.5	10,481	16,312
	Hardwood	299	299,000	78	0.5	5,831	
Randolph, GA	Softwood	8,419	8,419,000	75	0.5	157,856	232,853
	Hardwood	3,846	3,846,000	78	0.5	74,997	
Richmond, GA	Softwood	2,637	2,637,000	75	0.5	49,444	108,490
	Hardwood	3,028	3,028,000	78	0.5	59,046	
Rockdale, GA	Softwood	617	617,000	75	0.5	11,569	12,271
	Hardwood	36	36,000	78	0.5	702	
Schley, GA	Softwood	5,380	5,380,000	75	0.5	100,875	122,637
	Hardwood	1,116	1,116,000	78	0.5	21,762	
Screven, GA	Softwood	17,164	17,164,000	75	0.5	321,825	415,211
	Hardwood	4,789	4,789,000	78	0.5	93,386	
Seminole, GA	Softwood	3,494	3,494,000	75	0.5	65,513	72,026
	Hardwood	334	334,000	78	0.5	6,513	
Spalding, GA	Softwood	1,111	1,111,000	75	0.5	20,831	24,224
	Hardwood	174	174,000	78	0.5	3,393	
Stephens, GA	Softwood	1,459	1,459,000	75	0.5	27,356	53,291
	Hardwood	1,330	1,330,000	78	0.5	25,935	
Stewart, GA	Softwood	12,418	12,418,000	75	0.5	232,838	338,099
	Hardwood	5,398	5,398,000	78	0.5	105,261	
Sumter, GA	Softwood	7,295	7,295,000	75	0.5	136,781	239,839
	Hardwood	5,285	5,285,000	78	0.5	103,058	
Talbot, GA	Softwood	6,879	6,879,000	75	0.5	128,981	173,539

	Hardwood	2,285	2,285,000	78	0.5	44,558	
Taliaferro, GA	Softwood	5,949	5,949,000	75	0.5	111,544	138,044
	Hardwood	1,359	1,359,000	78	0.5	26,501	
Tattnall, GA	Softwood	5,362	5,362,000	75	0.5	100,538	136,457
	Hardwood	1,842	1,842,000	78	0.5	35,919	
Taylor, GA	Softwood	5,287	5,287,000	75	0.5	99,131	194,974
	Hardwood	4,915	4,915,000	78	0.5	95,843	
Telfair, GA	Softwood	12,640	12,640,000	75	0.5	237,000	297,821
	Hardwood	3,119	3,119,000	78	0.5	60,821	
Terrell, GA	Softwood	5,909	5,909,000	75	0.5	110,794	164,341
	Hardwood	2,746	2,746,000	78	0.5	53,547	
Thomas, GA	Softwood	11,299	11,299,000	75	0.5	211,856	255,127
	Hardwood	2,219	2,219,000	78	0.5	43,271	
Tift, GA	Softwood	2,263	2,263,000	75	0.5	42,431	60,293
	Hardwood	916	916,000	78	0.5	17,862	
Toombs, GA	Softwood	10,381	10,381,000	75	0.5	194,644	237,544
	Hardwood	2,200	2,200,000	78	0.5	42,900	
Townsend, GA	Softwood	111	111,000	75	0.5	2,081	3,524
	Hardwood	74	74,000	78	0.5	1,443	
Treutlen, GA	Softwood	6,996	6,996,000	75	0.5	131,175	151,397
	Hardwood	1,037	1,037,000	78	0.5	20,222	
Troup, GA	Softwood	5,007	5,007,000	75	0.5	93,881	168,391
	Hardwood	3,821	3,821,000	78	0.5	74,510	
Turner, GA	Softwood	3,908	3,908,000	75	0.5	73,275	75,459
	Hardwood	112	112,000	78	0.5	2,184	
Twiggs, GA	Softwood	5,391	5,391,000	75	0.5	101,081	144,937
	Hardwood	2,249	2,249,000	78	0.5	43,856	
Union, GA	Softwood	505	505,000	75	0.5	9,469	19,628
	Hardwood	521	521,000	78	0.5	10,160	
Upson, GA	Softwood	4,685	4,685,000	75	0.5	87,844	101,786
	Hardwood	715	715,000	78	0.5	13,943	
Walker, GA	Softwood	3,931	3,931,000	75	0.5	73,706	91,178
	Hardwood	896	896,000	78	0.5	17,472	
Walton, GA	Softwood	2,326	2,326,000	75	0.5	43,613	48,722
	Hardwood	262	262,000	78	0.5	5,109	
Ware, GA	Softwood	17,772	17,772,000	75	0.5	333,225	341,708
	Hardwood	435	435,000	78	0.5	8,483	
Warren, GA	Softwood	9,751	9,751,000	75	0.5	182,831	266,525
	Hardwood	4,292	4,292,000	78	0.5	83,694	
Washington, GA	Softwood	14,509	14,509,000	75	0.5	272,044	450,488
	Hardwood	9,151	9,151,000	78	0.5	178,445	
Wayne, GA	Softwood	20,573	20,573,000	75	0.5	385,744	418,640
	Hardwood	1,687	1,687,000	78	0.5	32,897	
Webster, GA	Softwood	7,509	7,509,000	75	0.5	140,794	180,671
	Hardwood	2,045	2,045,000	78	0.5	39,878	
Wheeler, GA	Softwood	7,837	7,837,000	75	0.5	146,944	202,129
	Hardwood	2,830	2,830,000	78	0.5	55,185	
White, GA	Softwood	1,769	1,769,000	75	0.5	33,169	47,813
	Hardwood	751	751,000	78	0.5	14,645	
Whitfield, GA	Softwood	3,287	3,287,000	75	0.5	61,631	100,553
	Hardwood	1,996	1,996,000	78	0.5	38,922	
Wilcox, GA	Softwood	9,275	9,275,000	75	0.5	173,906	197,014
	Hardwood	1,185	1,185,000	78	0.5	23,108	

Wilkes, GA	Softwood	13,162	13,162,000	75	0.5	246,788	365,445
	Hardwood	6,085	6,085,000	78	0.5	118,658	
Wilkinson, GA	Softwood	7,049	7,049,000	75	0.5	132,169	223,195
	Hardwood	4,668	4,668,000	78	0.5	91,026	
Worth, GA	Softwood	8,799	8,799,000	75	0.5	164,981	174,751
	Hardwood	501	501,000	78	0.5	9,770	
Total		1,340,536	1,340,536,000			25,357,603	25,357,603

Table A3-2. Calculation Sheet for Unmerchantable Standing Timber, and Underutilized Standing Timber, 2003

County	Removals of growing stock	Merchantable standing timber	% Currently being harvested	Unmerchantable standing timber	Unmerchantable timber available rate
	<i>dry ton/yr</i>	<i>dry tons</i>		<i>dry tons</i>	<i>dry tons/yr</i>
Appling	341,519	6,639,525	0.051	2,540,737	130,689
Atkinson	146,660	3,129,954	0.047	1,668,548	78,183
Bacon	185,349	3,183,016	0.058	1,397,095	81,354
Baker	67,624	3,824,358	0.018	1,179,538	20,857
Baldwin	121,449	2,961,659	0.041	1,139,495	46,727
Banks	84,499	3,910,305	0.022	1,301,973	28,135
Barrow	14,435	2,066,560	0.007	623,061	4,352
Bartow	164,214	4,100,890	0.040	1,825,695	73,107
Ben Hill	118,371	2,325,508	0.051	1,153,163	58,697
Berrien	138,005	4,248,392	0.032	1,830,401	59,459
Bibb	44,541	2,295,655	0.019	1,059,255	20,552
Bleckley	42,488	2,972,815	0.014	1,027,372	14,683
Brantley	365,197	4,776,859	0.076	2,450,593	187,351
Brooks	160,546	4,915,631	0.033	2,136,268	69,771
Bryan	186,390	6,827,058	0.027	2,687,343	73,369
Bulloch	275,222	6,571,216	0.042	2,348,503	98,362
Burke	413,937	10,411,208	0.040	3,715,196	147,712
Butts	73,857	2,410,989	0.031	862,257	26,414
Calhoun	96,806	1,752,118	0.055	876,525	48,428
Camden	319,838	9,382,717	0.034	3,405,696	116,093
Candler	118,807	1,799,872	0.066	845,325	55,799
Carroll	265,862	6,495,656	0.041	2,326,792	95,234
Catoosa	22,601	1,760,470	0.013	519,026	6,663
Charlton	290,204	6,386,135	0.045	3,417,100	155,282
Chatham	205,542	4,314,655	0.048	1,317,475	62,762
Chattahoochee	100,259	3,443,194	0.029	1,258,316	36,639
Chattooga	95,348	3,905,902	0.024	1,717,065	41,916
Cherokee	183,060	7,871,627	0.023	2,410,119	56,049
Clarke	6,811	1,050,030	0.006	339,475	2,202
Clay	103,652	2,197,591	0.047	929,219	43,828
Clayton	31,085	893,409	0.035	319,754	11,125
Clinch	545,852	9,272,391	0.059	5,577,413	328,334
Cobb	12,359	3,133,778	0.004	670,824	2,645
Coffee	198,108	5,332,360	0.037	2,419,767	89,899
Colquitt	215,187	4,721,833	0.046	1,297,675	59,139
Columbia	127,797	5,248,104	0.024	1,542,541	37,563
Cook	39,491	2,509,791	0.016	959,549	15,098
Cow eta	238,181	6,241,754	0.038	2,177,133	83,078
Crawford	159,172	3,598,914	0.044	1,651,682	73,050
Crisp	89,787	2,691,458	0.033	884,369	29,503
Dade	29,244	3,275,153	0.009	1,024,634	9,149
Dawson	46,388	4,727,606	0.010	1,550,224	15,211
De Kalb	304,170	5,953,391	0.051	1,786,082	91,254
Decatur	16,024	1,618,522	0.010	392,247	3,883
Dodge	299,018	6,461,582	0.046	2,301,002	106,482
Dooly	190,841	3,528,333	0.054	1,509,718	81,658

Dougherty	90,336	4,218,871	0.021	1,217,060	26,060
Douglas	23,303	3,982,538	0.006	1,062,220	6,215
Early	165,538	4,031,326	0.041	1,302,482	53,484
Echols	226,904	4,782,356	0.047	2,338,130	110,935
Effingham	286,346	6,387,255	0.045	2,678,322	120,072
Elbert	135,098	5,017,819	0.027	1,866,867	50,263
Emanuel	386,285	9,048,644	0.043	3,300,738	140,908
Evans	100,937	3,000,979	0.034	913,873	30,738
Fannin	56,780	7,430,325	0.008	2,632,030	20,113
Fayette	49,837	2,576,367	0.019	903,663	17,480
Floyd	328,313	5,800,203	0.057	2,314,005	130,981
Forsyth	55,305	2,260,130	0.024	681,867	16,685
Franklin	34,136	2,642,977	0.013	912,947	11,791
Fulton	157,070	6,188,700	0.025	1,663,436	42,218
Gilmer	49,364	10,696,735	0.005	3,374,407	15,572
Glascocock	81,906	1,948,217	0.042	705,977	29,680
Glynn	254,021	4,812,726	0.053	1,688,548	89,123
Gordon	66,018	2,570,623	0.026	1,124,836	28,888
Grady	176,645	4,575,818	0.039	1,554,889	60,025
Greene	206,246	5,346,596	0.039	2,068,418	79,790
Gwinnett	102,386	3,852,298	0.027	1,111,617	29,544
Habersham	107,572	6,254,665	0.017	1,924,019	33,091
Hall	60,248	5,421,949	0.011	1,869,708	20,776
Hancock	349,561	6,270,491	0.056	2,656,144	148,072
Haralson	113,558	4,090,739	0.028	1,412,978	39,224
Harris	219,390	6,642,946	0.033	2,695,673	89,027
Hart	13,439	2,270,470	0.006	640,054	3,789
Heard	225,176	3,330,996	0.068	1,506,195	101,819
Henry	121,601	3,966,277	0.031	1,260,583	38,648
Houston	134,564	4,608,491	0.029	1,685,660	49,220
Irwin	98,281	3,523,345	0.028	1,185,086	33,057
Jackson	73,259	4,143,114	0.018	1,562,781	27,633
Jasper	135,764	6,377,232	0.021	2,316,147	49,308
Jeff Davis	485,692	2,684,671	0.181	1,392,003	251,831
Jefferson	376,456	6,692,585	0.056	2,230,092	125,442
Jenkins	255,227	3,671,629	0.070	1,353,108	94,059
Johnson	233,075	3,242,843	0.072	1,333,412	95,837
Jones	142,382	5,378,471	0.026	2,288,981	60,595
Lamar	50,656	1,585,477	0.032	781,897	24,981
Lanier	80,740	3,100,963	0.026	1,061,665	27,643
Laurens	290,261	7,972,730	0.036	3,474,617	126,499
Lee	137,891	3,297,618	0.042	970,282	40,573
Liberty	257,649	7,987,604	0.032	2,255,216	72,744
Lincoln	112,431	3,340,600	0.034	1,072,508	36,096
Long	328,871	8,582,860	0.038	3,444,225	131,973
Lowndes	180,050	5,063,808	0.036	1,938,313	68,919
Lumpkin	36,538	6,882,383	0.005	2,331,530	12,378
Macon	129,104	4,578,355	0.028	1,372,164	38,693
Madison	153,854	3,412,710	0.045	1,618,761	72,978
Marion	196,491	5,547,638	0.035	1,664,761	58,964
McDuffie	94,049	3,292,013	0.029	1,156,742	33,047
McIntosh	187,892	2,962,267	0.063	1,517,930	96,280
Meriwether	189,632	6,521,928	0.029	2,542,378	73,922

Miller	29,114	2,056,910	0.014	913,507	12,930
Mitchell	212,335	2,365,066	0.090	910,191	81,717
Monroe	243,572	4,999,188	0.049	1,724,469	84,020
Montgomery	153,136	2,375,583	0.064	947,970	61,108
Morgan	168,676	5,155,542	0.033	1,821,114	59,582
Murray	119,249	5,716,639	0.021	2,107,790	43,968
Muscogee	107,911	2,176,475	0.050	874,001	43,333
Newton	69,292	4,129,447	0.017	1,038,111	17,419
Oconee	54,357	1,990,082	0.027	678,973	18,545
Oglethorpe	244,178	7,505,699	0.033	2,597,891	84,515
Paulding	176,244	4,916,699	0.036	1,818,686	65,193
Peach	24,056	617,191	0.039	232,841	9,075
Pickens	92,567	3,789,635	0.024	1,637,140	39,989
Pierce	169,560	4,289,742	0.040	1,655,672	65,444
Pike	53,963	2,554,403	0.021	1,041,488	22,002
Polk	138,318	3,397,484	0.041	1,289,548	52,500
Pulaski	106,615	1,887,284	0.056	686,295	38,770
Putnam	153,430	4,584,535	0.033	1,748,961	58,532
Quitman	73,781	2,052,790	0.036	1,061,083	38,137
Rabun	16,312	10,906,877	0.001	3,233,930	4,836
Randolph	232,853	4,073,327	0.057	1,876,421	107,266
Richmond	108,490	3,001,166	0.036	1,097,598	39,677
Rockdale	12,271	1,460,002	0.008	389,101	3,270
Schley	122,637	2,016,197	0.061	798,576	48,574
Screven	415,211	9,767,866	0.043	3,400,267	144,538
Seminole	72,026	1,261,054	0.057	369,900	21,127
Spalding	24,224	2,109,936	0.011	750,701	8,619
Stephens	53,291	2,125,219	0.025	792,133	19,863
Stewart	338,099	4,571,646	0.074	2,587,199	191,338
Sumter	239,839	3,767,174	0.064	1,758,721	111,970
Talbot	173,539	5,110,099	0.034	2,663,654	90,458
Taliaferro	138,044	3,015,867	0.046	1,184,894	54,236
Tattnall	136,457	3,877,102	0.035	1,538,195	54,138
Taylor	194,974	3,009,272	0.065	1,884,496	122,098
Telfair	297,821	4,622,224	0.064	2,039,481	131,408
Terelll	164,341	2,802,174	0.059	1,165,425	68,349
Thomas	255,127	6,195,240	0.041	1,627,124	67,007
Tift	60,293	2,188,899	0.028	737,966	20,327
Toombs	237,544	2,592,235	0.092	1,139,718	104,440
Towns	3,524	3,506,029	0.001	1,123,216	1,129
Treutlen	151,397	2,685,642	0.056	785,864	44,301
Troup	168,391	7,081,228	0.024	2,481,839	59,018
Turner	75,459	1,654,088	0.046	638,765	29,140
Twiggs	144,937	5,951,091	0.024	2,517,518	61,313
Union	19,628	5,816,212	0.003	1,923,377	6,491
Upson	101,786	4,418,680	0.023	1,770,837	40,792
Walker	91,178	7,088,477	0.013	2,408,734	30,983
Walton	48,722	4,182,579	0.012	1,194,674	13,916
Ware	341,708	7,424,001	0.046	3,998,142	184,024
Warren	266,525	4,746,742	0.056	1,544,595	86,728
Washington	450,488	7,650,554	0.059	3,130,012	184,305
Wayne	418,640	6,226,078	0.067	2,915,414	196,032
Webster	180,671	1,523,231	0.119	944,485	112,026

Wheeler	202,129	4,841,924	0.042	1,773,344	74,029
White	47,813	5,351,110	0.009	1,767,803	15,796
Whitfield	100,553	2,987,888	0.034	942,037	31,703
Wilcox	197,014	4,676,593	0.042	1,895,283	79,844
Wilkes	365,445	6,398,824	0.057	2,350,831	134,259
Wilkinson	223,195	6,512,091	0.034	2,834,524	97,150
Worth	174,751	7,329,499	0.024	2,135,796	50,922
Total	25,357,603	704,097,848		265,203,508	10,109,645